Chapter V:
Management Philosophy and Management Issues

CHAPTER V: LANDSCAPE MANAGEMENT PHILOSOPHY AND MANAGEMENT ISSUES

Management Philosophy

The publication *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* provides professional standards and guidance for treatments to cultural landscapes listed in or eligible for the National Register of Historic Places. The document defines four types of treatment for historic landscapes including preservation, restoration, reconstruction, and rehabilitation.[1]

The Jewel Cave Historic Developed Area retains a high level of integrity (see Figure 4.2). The site as it currently exists possesses elements from several historical periods. Throughout each of the periods, the site was managed by the National Park Service to provide visitor access and interpretation of the natural cave resource. While this use is projected to continue into the foreseeable future, some former uses have been discontinued. The site retains remnants that hint of previous uses that included a public campground, park housing site, and the administrative and utilities operations for the park. Removal of these facilities from the historic area has resulted in the reduction of development impacts and a high level of integrity. The area retains its essential historic use—that of serving as the primary above-ground contact and interpretation site for the historic portion of the cave. This continued use, and the

[1] Birnbaum, Charles A. and Christine Capella Peters, 1996. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.* Washington DC: Department of the Interior, National Park Service, 3-5.

projected needs for visitor services while protecting historic and natural resources, indicate a need for flexibility in future management treatments.

Preservation

Preservation involves applying measures to sustain the *existing* form, integrity, and materials of a historic property. This approach focuses upon stabilizing and protecting extant historic resources, rather than replacing missing elements. It is appropriate when a historic property is essentially intact and does not require extensive repair or replacement; depiction at one particular period of time is not appropriate; and when continuing or new use does not require additions or alterations.[2]

Although a preservation management approach could be effectively applied to the Jewel Cave Historic Area, the limitations imposed would preclude the introduction of new elements that could reduce potential impacts on cultural and natural resources. For instance, alterations to the Ranger Cabin were necessary to protect the building from structural fire. The alterations included removing the public restrooms that were a part of the building since its construction in 1935. The restrooms were not universally accessible, and could not be made accessible without greatly altering historic integrity and appearance of the building and surrounding landscape. The restroom space was adapted to provide room for a tanked fire suppression system. The site currently does not include permanent public restrooms, and portable toilets are situated in the parking lot. The physical character of the portable restrooms is

[2] Ibid., 17-18.

incongruent with the historic character of the site, however they do provide a service that is necessary and has been associated with the site since the CCC period. Providing permanent restroom facilities will require the addition of a new structure within the historic district.

Restoration

Restoration is the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period in time. This includes reconstruction of missing features from the restoration period, and removal of features from all other periods. The approach can be considered only when the property's significance during a particular period of time outweighs the loss of extant elements from other historical periods; and when there is substantial physical and documentary evidence for the work; and when contemporary alterations and additions are not planned.[3] Restoration is not an appropriate approach for the proposed Jewel Cave Historic District because significant extant features relate to more than one historic period, adequate documentary evidence does not exist to restore the property to one period, and contemporary needs require some alterations.

Reconstruction

Reconstruction is the act or process of using new construction to depict a non-surviving site, landscape, building, structure, or object as it appeared at a specific period of time in its historic location. The approach is appropriate only when the

[3] Ibid., 89-90.

property's significance during a particular period of time outweighs the potential loss of extant features that characterize other historical periods. In addition, there must be substantial physical and documentary evidence for the work, and the work must be clearly identified as a contemporary re-creation.[4] The Jewel Cave Historic Area site is not eligible for reconstruction because significant extant features relate to more than one historic period, adequate documentary evidence does not exist to reconstruct the property to one period, and contemporary needs require some alterations.

Rehabilitation

The act or process of Rehabilitation allows repairs, alterations, and additions necessary to enable a compatible use for a property as long as the portions or features which convey the historical, cultural, or architectural values are preserved. This approach is appropriate when depiction at one particular period of time is not appropriate; repair or replacement of deteriorated features is necessary; and alterations or additions are needed for a new use.[5]

Rehabilitation has been chosen as the most appropriate management philosophy for the proposed Jewel Cave Historic District. This philosophy has been chosen because of the existence of features related to more than one type and period of significance, and the need for minor alterations to accommodate visitor services and protection of the historic resources. Three alternative rehabilitation treatment approaches have been developed and evaluated for the proposed Jewel Cave Historic district. The alternatives are described in Chapter Six.

[4] Ibid., 127-129.
[5] Ibid., 47-48.

Management Issues

Management issues for the proposed historic district are summarized below:

- Management of the site needs to be closely coordinated with plans for interpretation.
- Parking at Service Drive "A" is impacting the historic character of the area near the Ranger Cabin.
- The lantern storage shed is necessary for storing paraffin and oil lanterns that are used for the historic cave tour. Safety guidelines regulate the storage of these materials.
- Bruce Jones is preparing an archeological report for the site of the Michaud hotel.
- The park would like to have guidance regarding the eligibility of US Highway 16 near Hell Canyon. The state of South Dakota is currently considering realigning / widening this portion of the road.
- Any septic system at the historic site needs to utilize a self-contained system (vault, composting, etc…). Septic systems are not a good option in the park, due to their potential impacts to the cave.
- An existing concrete septic system exists at the historic site that may have been constructed during the CCC era. A drain field was installed in the mid- to late-1970s.
- A *Historic Structure Report* for the Ranger Cabin was completed in 1999. The report provides alternative approaches for treatment of the building, and an evaluation of each. The report recommends Restoration to the cabin's circa

1940 exterior appearance and provides detailed guidance for treatment. In 2002 the Ranger Cabin was repaired according to the HSR recommendations.

- A fire suppression system was installed in the Ranger Cabin (HS-1), to help protect the building from interior fires. The system is located in the former public restroom area. The regional historical architect indicates that it would be far easier and less expensive to clean up water damage than to restore a building reduced to charcoal.
- National Monument managers are considering removing the interior fire suppression system from the Ranger Cabin.
- The Ranger Cabin's recently installed internal fire suppression system would not protect the building from a forest fire. An attempt to provide external fire suppression would be cost prohibitive and damaging to the landscape. Continued controlled burns and trimming dead overhanging branches surrounding the cabin would be the only recourse in passive fire protection. The park should have a formal fire protection plan for the Ranger Cabin, prescribing a process for protecting the building in the event of a forest fire. The resources necessary for implementing the plan should be readily available.
- The permanent restroom facilities need to be replaced at the site. Currently this need is served with portable toilet structures.
- The park is interested in regrading and revegetating the site beyond Service Drive "A" that was used for housing and maintenance structures during the 1950s through the 1970s.

- Need to provide visitor access to the Ranger Cabin (not necessarily universally accessible).
- Need vehicular access for maintenance vehicles to the Ranger Cabin.
- Need a place for visitors to wait for tours to begin.
- Need parking or alternative transportation option for visitors.
- A *Long Range Interpretive Plan* is being prepared for the park.
- A shuttle transportation system from the main visitor center to the historic area may be established in the future. It is possible that an interpreter would drive the shuttle to provide a "package deal." Implementation of the system is tentatively predicted for FY 2006 or 2007. The CLR should address this possibility.
- The management team has not yet decided if the historic area would still include vehicular access for visitors for picnicking and self-guided surface exploration. They would like guidance from the CLR regarding this. Given the proposed shuttle system, the parking needs at the site will either remain the same as they currently are, or possibly be reduced.
- Often visitors arrive in large recreational vehicles that take up a large portion of the parking lot.
- Currently all of the signs at the main visitor center are being replaced with new signs that meet the new NPS messaging standards. Messaging standards have the potential to conflict with historic character. The signs at the historic area should not be changed to match the new signs at the visitor center.

- The existing signs along the Canyons Trail do not follow messaging standards. They are consistent throughout the trail to provide a unified look for hikers that does not conflict with the character of the historic area. These signs should not be changed to match the new signs at the visitor center.
- The Canyons Trail should continue to provide a pedestrian route to the historic site. Often people using this trail become confused and disoriented. Suggestions regarding signs or other orientation for visitors are welcome.
- The entrance sign at the historic area is confusing to some people—especially those approaching the site from the west. They mistake this for the main entrance of the park. The highway sign, its content, and location have been considered extensively regarding this issue. The construction of a new highway bridge along HW 16 would help to alleviate this problem.
- There is a vehicular gate at the entrance to the historic area that is kept closed when there is no staff at the site. However, when the staff members are in the cave, they are not accessible to incidental visitors. .
- Tours of the historic area are conducted from Memorial Day through Labor Day. During this time the bats are not hibernating, and the tours do not disturb them. The historic tours allow a maximum of 20 participants. The treatment plan should address the potential need for a weather shelter at the site. Currently, visitors and staff wait in cars or on the front porch of the cabin if the weather is bad. The treatment alternatives should also address possibilities for staff needs at the site.

- It would be helpful to have an orientation kiosk at the site. It should fit into the historic theme of the area using materials and design that relate well to the period of interpretation.
- Consideration of the possibilities for interpretation of the historic hotel site and spring should be included in the CLR. The potential impacts of these alternatives should be evaluated. The proximity of the site to the highway presents safety issues. The realignment of the highway, if the new bridge is built, would help to alleviate the safety issue. The potential for vandalism by bottle collectors could be greater if this site were more widely known.
- Circulation within the historic developed area. Universal accessibility to Jewel Cave is provided at the main visitor center. The topography within the historic developed area, and the historic resources themselves, inhibit users with mobility impairments from traversing the area. Modification of the upper and lower trail, the CCC-constructed stone stairway, the Ranger Cabin, and the historic cave tour, to provide universal accessibility for visitors would negatively impact the integrity of these historic resources and the natural resources to which they respond directly. Therefore, it is not a goal to provide universal access to the Ranger Cabin, trail to the cave entrance, or the cave. Any new facilities developed should be designed to accommodate universal accessibility standards, as long as this consideration does not result in negative impacts to the significant cultural and natural resources at the site.

Chapter VI:
Treatment Alternatives

CHAPTER VI: TREATMENT ALTERNATIVES

Overview

A general management philosophy of rehabilitation has been selected for the proposed Jewel Cave Historic District landscape. The act or process of rehabilitation allows repairs, alterations, and additions necessary to enable compatible use of a property as long as the portions or features which convey the historical, cultural, or architectural values are preserved. This philosophy has been chosen to allow the preservation and interpretation of extant historic features associated with the three associated property types defined by the National Register multiple property listing, and to allow alterations within the district that are deemed necessary to accommodate current and future preservation and interpretation of the historic resources.

Three alternative treatments have been developed for the Jewel Cave historic district. The treatment alternative descriptions include the no action alternative and two action alternatives. The no action alternative is required by NEPA and provides a baseline for evaluation of potential impacts from each treatment alternative and eventual comparison of all treatment alternatives. The evaluation of potential impacts is presented in Chapter VII: *Impacts of Treatment Alternatives*. Chapter VII concludes with a comparison of impacts, discussion of mitigation measures and identification of the Environmentally Preferred Alternative.

Treatment Alternative #1: Current Treatment (No Action)

The historic area would continue to be managed as it is currently and no new policies would be implemented. The proposed Jewel Cave historic district is managed as an interpretive area. Visitors to the park may purchase tickets to take a historic cave tour that begins near the Ranger Cabin. Minimal facilities are provided for visitors including a small parking area, trails, portable toilets, picnic tables, and a drinking fountain. The historic area can be reached by visitors via private automobile during the park's operational hours. The historic area can also be reached by pedestrians via the Canyons Trail. Service drive "A" provides access for NPS staff and maintenance vehicles, a small parking area, and a site for the lantern storage shed. A visitor seating area is adjacent to the service driveway. Service driveway "B" provides access for NPS maintenance vehicles to approach the pump building. The site of the former campground is adjacent to this driveway, and is demarcated with large stones. Selected historic resources within the area are interpreted and maintained in good to fair condition.

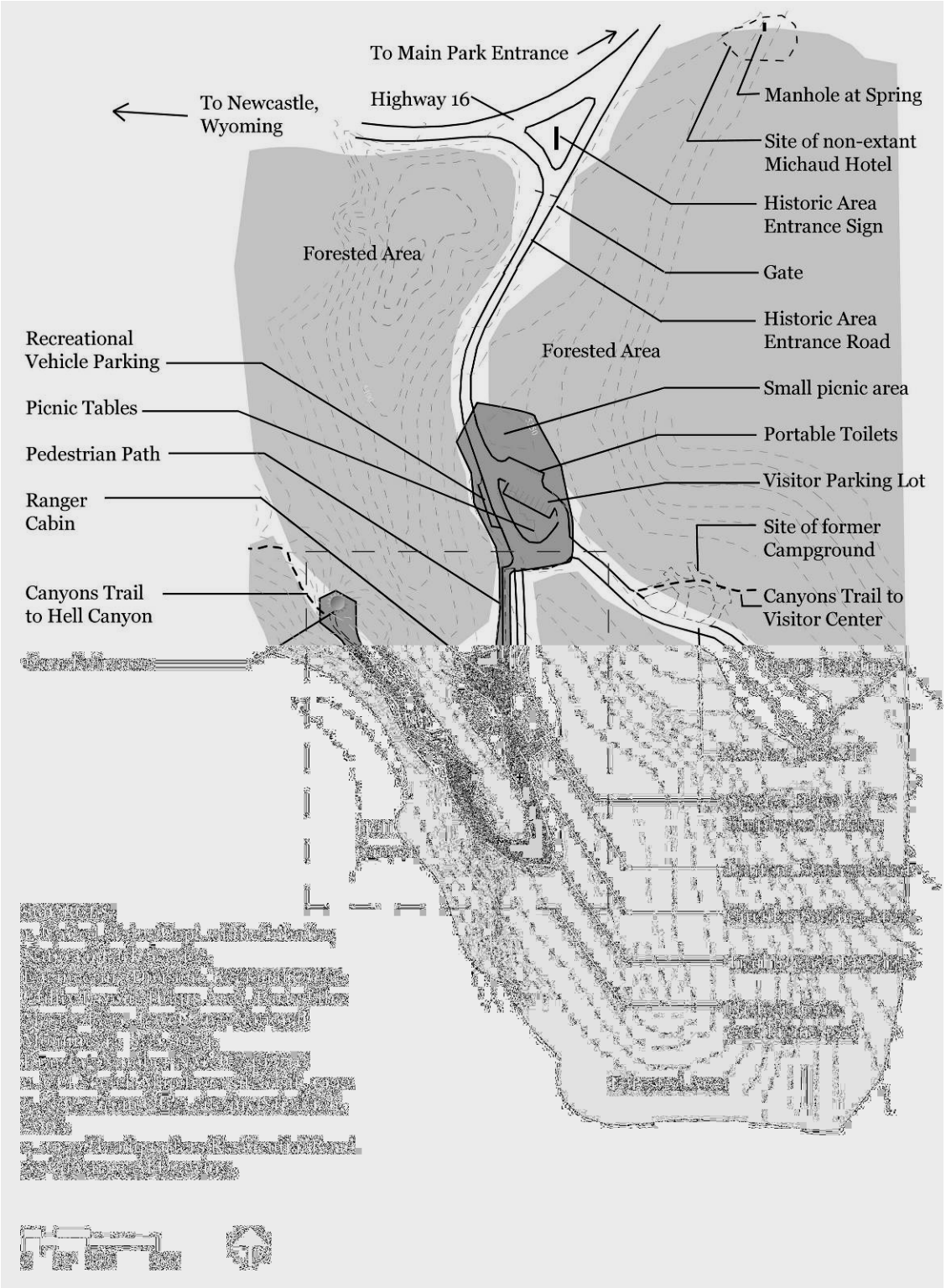


Figure 6.1: Historic Developed Area Treatment Alternative #1, No Action

Treatment Alternative #2: Ca. 1940 Representation with Shuttle Transportation

This alternative strives to present the historic developed area as it existed in ca.1940. This date represents the completion of the CCC-developments at the site, and the establishment of on-site management and interpretation by the National Park Service. The Historic Period Plan for 1933 through 1939 (see Figure 2.25 in Chapter 2) was developed based on construction documents, historic photographs, and other documentation from the CCC-development period, and provides the best understanding of the site conditions at the beginning of 1940. An overall management philosophy of rehabilitation would be applied, with restoration, rehabilitation, and preservation treatments used to address specific sites or elements.

This alternative includes four proposed management zones including; 1) Historic Resource Management and Interpretation Zone, 2) Natural Resource Management Zone, 3) Archeological Resource Management Zone, and 4) Park Operations Zone.

The majority of the historic area would be in the *Historic Resource Management and Interpretation Zone*. The historic area would be restored to represent its CCC-era condition as much as possible, based on available documentation. In addition to CCC-era elements, additional features would be developed to meet minimal operational needs. Visitor access to the site would be limited to visitors taking the historic cave tour. Those visitors would be transported to the site from the main visitor center in a park shuttle vehicle. The gate at the entrance to the historic area would be closed to other visitor traffic.

The Ranger Cabin has been restored to its ca. 1940 physical condition. The historic function of the building would also be restored in this alternative. It would serve as an office for the historic area ranger. Public restrooms would be re-established in the Ranger Cabin, and the historic fire protection system—providing mobile protection with pumper trucks, would be reinstated. The entrance/loop road would be restored to its 1939 configuration and the former ranger's tent site would be indicated with an interpretive sign. A small structure would be constructed in the former location of the ranger's tent. The structure would be used for providing shelter for visitors waiting for the shuttle. Another structure would be constructed nearby for storing the cave-tour lanterns. The general area of the former CCC camp would be indicated with an interpretive sign.

The pedestrian trail between the non-extant ranger's tent and the Ranger Cabin would be reconstructed. The pedestrian trail between the Ranger Cabin and the cave entrance would be restored to its 1939 condition when sufficient documentation exists to achieve this goal. The earlier pedestrian trail between the Ranger Cabin and the cave entrance would be interpreted as a historic circulation route.

The Canyons Trail would continue to provide a pedestrian route between the historic area and the park's Visitor Center and Administrative area. However, the Canyons Trail approach to the historic area from the east would be altered, so that it enters the area near the site of the non-extant Ranger's tent.

Two areas on site would be managed according to the *Natural Resource Management Zone*. Service drive "A" and the associated parking lot would be removed, and the landscape restored to its pre-development slope and vegetation.

The former housing area would also be restored to its pre-development slope and vegetation. The lantern storage shed would be relocated to the *Historic Resource Management and Interpretation Zone*. The circular interpretation/waiting area would be removed and replaced with a waiting area at the new shelter. The existing drinking fountain would be removed and a new fountain installed at the new shelter. The former NPS campground site would also be restored to its pre-development condition.

The *Archeological Resources Management Zone* encompasses the area near Highway 16 where the non-extant Michaud hotel and associated resources were located. The site currently includes the stone foundation of the hotel building and the CCC-constructed manhole at the spring. An Archeological Overview is currently being prepared for the area by Bruce Jones of the Midwest Archeological Center. Recommendations in this CLR/EA will defer to recommendations in that report when it is completed. The site would be stabilized, monitored for impacts by vandals or natural forces, and interpreted as a representative of the early developments at the historic area by the Michaud group. No visitor access to the site is recommended.

The *Park Operations Zone* would provide an area for service vehicles and employee parking. Service drive "B" would be maintained as a route for service vehicles and to provide access to the pump building.

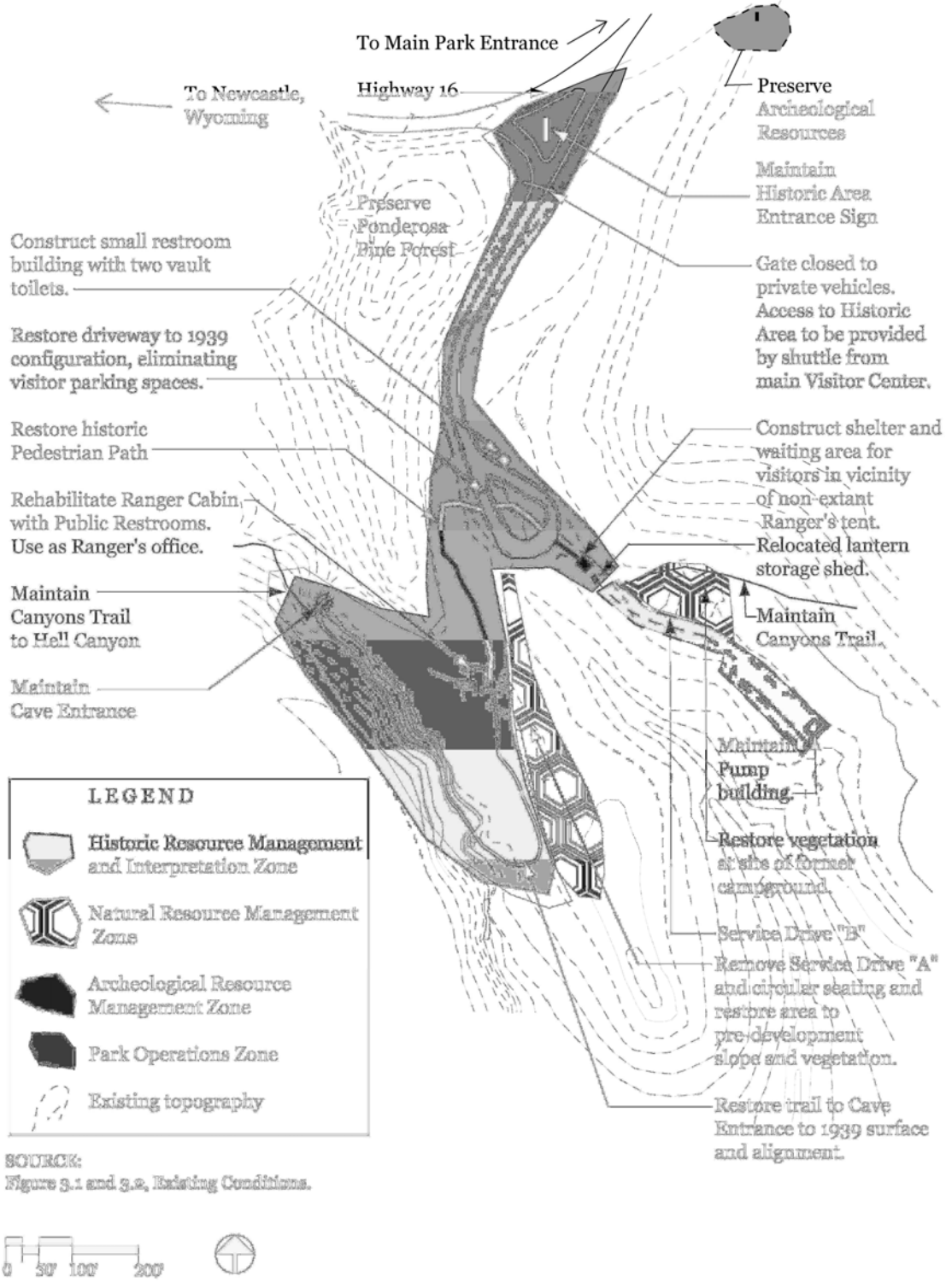


Figure 6.2: Historic Developed Area Treatment Alternative #2:
Ca. 1940 Representation with Shuttle Transportation

Treatment Alternative #3: Rehabilitation with improved Visitor Services

The purpose of this alternative is to protect and interpret extant historic resources, while improving visitor services. The overall management philosophy would be rehabilitation, with restoration, preservation, and rehabilitation applied to selected elements. Visitor services would be improved by adding an interpretive shuttle tour from the main visitor center to the historic site, adding a shelter/storage building, developing a vault toilet building, and providing a small picnic area. Visitor comfort while at the site would improve, as would transportation alternatives for accessing the site. The road and parking lot would remain open to visitors during Monument operational hours, to allow visitors to visit and explore the site at their leisure.

This alternative treatment plan consists of five management zones including; 1) Historic Core, Historic Resource Management and Interpretation Zone, 2) Historic Resource Management and Visitor Services Zone, 3) Archeological Resource Management Zone, 4) Park Operations Management Zone, 5) Ponderosa Pine Forest Preservation Zone.

The *Historic Core, Historic Resource Management and Interpretation Zone,* includes the Ranger Cabin, upper and lower trails to the cave entrance, the stone steps, retaining wall, cave entrance, and area within the outline created by these resources. All of these historic resources retain a high level of integrity. The cultural resources within this zone would be preserved or repaired as necessary to maintain them in good condition. The Ranger Cabin has been restored to its ca.1940 physical condition with the addition of a fire-suppression system, and the removal of the public

restrooms. The building would be maintained as restored and future management would adhere to recommendations made in the Historic Structure Report. The upper and lower trails to the cave entrance would be repaired by replacing the entirety of the pavement with new material and regrading where necessary. Erosion problems would be corrected by grading and implementing erosion control methods.

The ponderosa pine forest that constitutes the main vegetative resource within the zone would be preserved. Non-contributing elements within the historic core would be removed or relocated to a site outside of the historic core. These include the circular seating area and the drinking fountain. The Historic Core would be used for a guided tour that serves as the first portion of the historic cave tour. It would also continue to be open for use by visitors for informal explorations of the cultural landscape; however, the Ranger Cabin and historic cave entrance would only be unlocked during the staff-guided tours.

The *Historic Resource Management and Visitor Services Zone* includes historic resources associated with more than one period of significance. Integrity within this zone ranges from high to moderately-low. The zone includes the park entrance road and parking areas, reconstructed historic area entrance sign, the northern-most portion of Service Drive "B," and the site of the former NPS campground. Within this zone, the sites of non-extant historic elements would be interpreted (including the ranger's tent site, the CCC camp site, NPS housing and administrative area, and the NPS campground site). Interpretation should be consistent with the Monument's Interpretive Prospectus, and could include Ranger-led discussions as part of the historic cave tour. Additionally, a brochure about the

history of the site could be made available to visitors. It is recommended that signs or other elements not be added to the site to provide this information.

Selected visitor services would be provided including parking, restrooms, a weather shelter/waiting area for interpretive programs, a lantern storage facility, limited interpretive signs, a picnic area, and hiking trails. The existing loop road and parking area would be maintained and altered slightly to allow for a shuttle drop-off site near the proposed visitor services building. A path between the visitor services building and the trail to the Ranger Cabin would be installed along the outside edge of the loop road.

A small visitor-services building including an exterior shelter and lantern storage facility, would be developed at the site where the portable toilets are now located. Service drive "B" would remain, and employee parking would be provided near the pump building. The visitor parking lot would remain, and a shuttle drop-off area would be designated near the visitor services building.

A vault toilet building and small picnic area for visitors would be provided near the site of the former NPS campground. The vault toilet building would provide two stalls. The site of the non-extant CCC camp could be interpreted by Rangers as part of the overview of the historic area. The interpretation would be consistent with the park Interpretive Prospectus.

The entrance road would be open to visitors during the park's operational hours. A sign would be posted in the parking area restroom/kiosk/shelter explaining a brief history of the site, and explaining that tickets for the historic cave tour must be purchased at the main visitor center.

The *Archeological Resources Management Zone* encompasses the area near Highway 16 where the non-extant Michaud hotel and associated resources were located. The site currently includes the stone foundation of the hotel building and the CCC-constructed manhole at the spring. An Archeological Overview is currently being prepared for the area by Bruce Jones of the Midwest Archeological Center and the production of the final report is in progress. Recommendations in this CLR/EA will defer to recommendations in that report when it is completed. In the meantime, the site would be stabilized, monitored for impacts by vandals or natural forces, and interpreted as a representative of the early developments at the historic area by the Michaud group. No visitor access to the site is recommended. The archeological resources located in Hell Canyon are outside of the Historic Area Treatment Zones. The three sites include the Hell Canyon Road, a concrete building foundation, and remnants of a masonry fireplace. These resources would be managed according to recommendations made by the Midwest Archeological Center.

The *Park Operations Zone* includes the southeastern portion of Service drive "B," the pump building, and Service Drive "A." At Service Drive "B," the driveway and building would be maintained for use by NPS staff. The driveway would serve as employee parking and maintenance access. The portion of the drive that extends past the former campground site would not be open to visitors.

Service drive "A" and the employee parking area would be removed. All of the pavement along Service drive "A" would be removed and native vegetation would be restored in the areas of pavement removal. A two-track drivable surface would be maintained from the loop road to the cabin for use by emergency vehicles. If, in the

future, it is determined that this access for emergency vehicles is not required, consideration would be given to restoration of the road grade to its original topography, and also restoration of the native vegetation in the area.

The existing lantern storage shed would be removed. The new visitor services building would include a space for lantern storage that meets safety requirements. The circular visitor waiting/seating area (currently located near the lantern storage shed and Service drive "A") would be removed and this function would be provided at the new visitor services building. A picnic table for employees would be located within the former housing area, in a site that is screened from visitor's view.

The *Ponderosa Pine Forest Preservation Zone* includes the remaining land within the proposed historic district boundary. Cultural resources within this zone include the Hell Canyon Road, and two archeological sites in Hell Canyon. The Hell Canyon Road would be maintained as a fire access road. Its alignment should be maintained with mowing and repairs when necessary. The use of the road for early access to the area could be interpreted as part of the Canyons Trail by including information about it in a trail brochure. The archeological resources in this zone would be managed according to the recommendations of the Archeological Report that is currently being prepared by Bruce Jones of the Midwest Archeological Center. Again, if the report indicates this would be appropriate, these resources could be interpreted as part of a Canyons Trail brochure. Natural resources within the zone include Ponderosa Pine forest. The forest would be managed according to natural resource management goals for the overall Monument. The Fire Management Plan for

the Monument provides guidelines regarding treatment for the forest that should be adhered to for management of this zone.

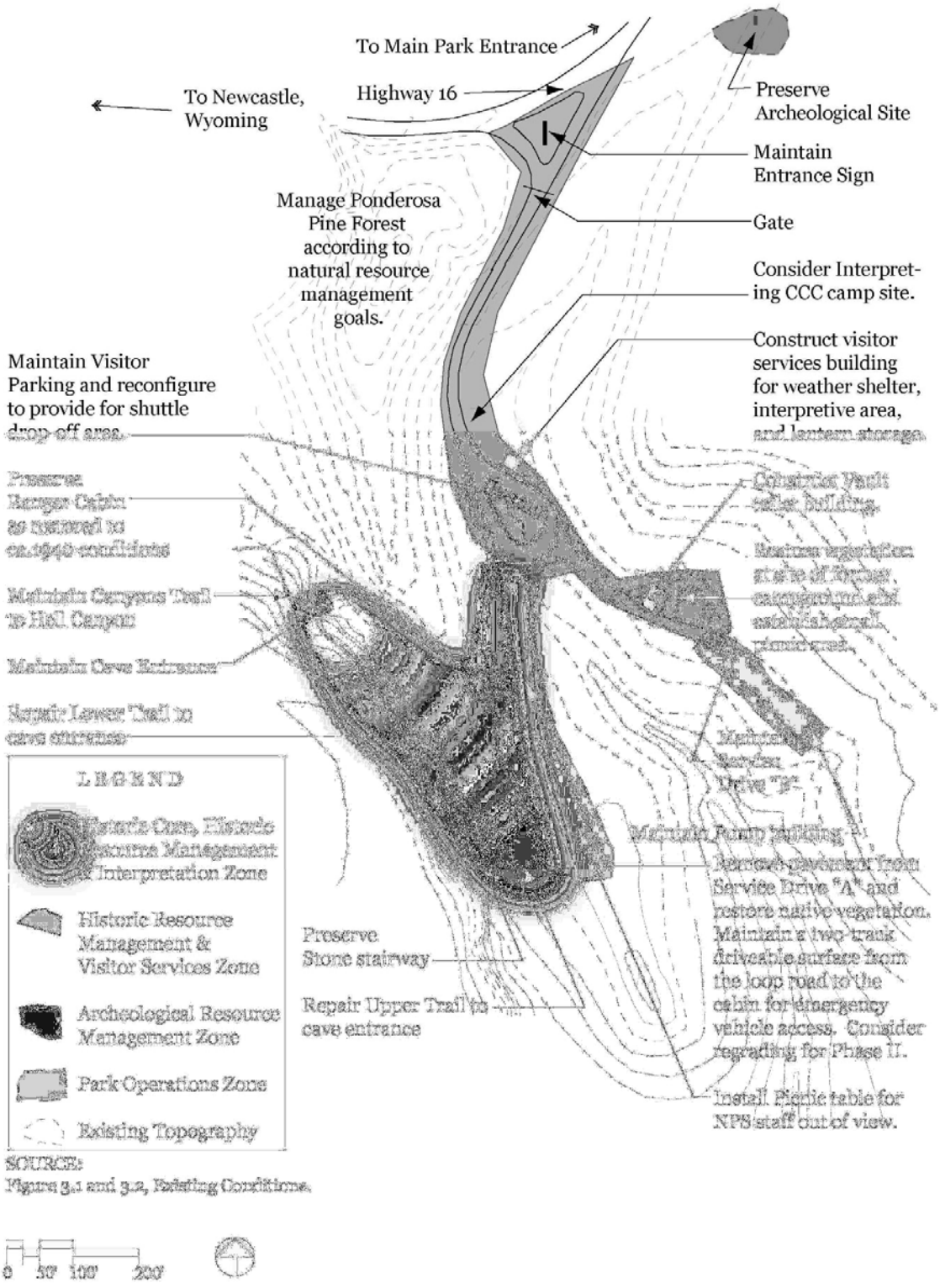


Figure 6.3: Treatment Alternative #3: Rehabilitation with Improved Visitor Services

Chapter VII:
Impacts from Treatment Alternatives (Environmental Consequences)

CHAPTER VII: IMPACTS FROM TREATMENT ALTERNATIVES (ENVIRONMENTAL CONSEQUENCES)

Environmental Consequences

This section of the *Environmental Assessment* forms the scientific and analytic basis for the comparisons of treatment alternatives as required by 40 CFR 1502.14. This discussion of impacts (effects) is organized in parallel with Chapter 3: Existing Conditions (Affected Environment) and is organized by impact topic areas. The no action alternative and each treatment alternative are discussed within each impact topic area. To the extent possible, short-term, long-term, beneficial, and adverse impacts of each alternative are described for each resource area. The comparison of impacts is summarized in Table 5. The impact analysis presented in this chapter results in a determination of an Environmentally Preferred Alternative. The Environmentally Preferred Alternative is described at the end of this chapter.

Intensity, Duration, and Type of Impact

Evaluation of alternatives takes into account whether the impacts would be:

- Negligible — the effect is localized and not detectable or the effect is at the lowest levels of detection.
- Minor — the effect is localized and barely detectable, but would not affect overall structure of any natural community or is confined to a small area of a cultural resource.
- Moderate — the effect is clearly detectable and could have an appreciable effect on individual species, communities, and/or natural

processes, or is sufficient enough to cause a change in the character-defining of a cultural resource.

- Major — the effect is highly noticeable, and would have a substantial influence on natural resources, including effects on individuals or groups of species, communities, and/or natural processes; or results in a substantial and highly noticeable change in character-defining features of a cultural resource.

Duration of impacts is evaluated based on the short-term or long-term nature of alternative-associated changes on existing conditions. Type of impact refers to the beneficial or adverse consequences of implementing a given alternative. More exact interpretations of intensity, duration, and type of impact are given for each resource area examined. Professional judgment is used to reach reasonable conclusions as to the intensity and duration of potential impacts.

Cumulative Impacts

The CEQ regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered for both the no-action and proposed action alternatives.

Cumulative impacts were determined by combining the impacts of the proposed alternative with potential other past, present, and reasonably foreseeable

future actions. Therefore, it was necessary to identify other ongoing or foreseeable future projects within the surrounding area.

- Past cumulative actions:
    - Relocation of main monument visitor center, park housing, maintenance facilities and administrative headquarters from the historic area to the new site in 1972.
    - Jasper Fire 2000
    - Restoration of the Ranger Cabin (HS-1) 2002
- Reasonably foreseeable cumulative actions include:
    - Construction of restroom facility. This would be a two-unit vault system installed in a small structure. The building would have exterior details that compliment the materials and workmanship of the Ranger Cabin (HS-1).
    - The South Dakota Department of Transportation desires to widen and straighten U.S. Highway 16 through the Monument, which forms the northern and western boundary of the proposed formal designation of the Historic area.

Impairment Analysis

The *National Park Service Management Policies* (NPS, 2001a) requires analysis of potential effects to determine whether or not actions would impair park resources or values.

The fundamental purpose of the NPS, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to

conserve park resources and values; and the park's enabling legislation, as amended, further mandates resource protection. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable, actions that would adversely affect park resources and values that are related to the legislative establishment of the park, National Historic Landmarks, or other nationally significant resource. Jewel Cave National Monument was established to preserve the Jewel Cave ecosystem, especially significant caverns and other geological features.

These laws give NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. Impairment may result from NPS activities in managing the park, from visitor activities, or from activities undertaken by concessionaires, contractors, and others operating in the park. Impairment of park resources can also occur from activities occurring outside park boundaries. An impact would be more likely to

constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park.
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park.
- Identified as a goal in the park's GMP or other relevant NPS planning documents.

An impairment determination is included in the environmental consequences analysis section for all impact topics relating to park resources and values.

Impacts to Cultural Resources

Basis of Analysis:

- **Preservation of the Archeological/Historic Cultural Resource –** Impacts are examined from the perspective of *The Secretary of Interior's Standards for the Treatment of Historic Properties*.
- **Preservation of Cultural Landscape Elements –** Impacts are examined from the perspective of *Guidelines for the Treatment of Cultural Landscapes*.

Intensity levels:

- **Negligible** — Impact(s) would be at the lowest level of detection, or barely perceptible and not measurable. For the purposes of Section 106, the determination of effect would be — **no effect**.

- **Minor — Adverse impact** - impacts would not affect the overall cultural landscape, or the significant landscape characteristics. For purposes of Section 106, the determination would be — **no adverse effect**.

  Beneficial impact - preservation of the overall cultural landscape and significant landscape characteristics in accordance with the *Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of*

Cultural Landscapes. For purposes of Section 106, the determination of effect would be — **no adverse effect**.

- **Moderate — Adverse impact** - impacts would alter the cultural landscape or one or more of the significant landscape characteristics, but would not diminish the integrity of the landscape to the extent that its NRHP status or eligibility is jeopardized. For purposes of Section 106, the determination would be — **no adverse effect**.

  Beneficial impact - rehabilitation of the cultural landscape or one or more of the significant landscape characteristics in accordance with the *Secretary of Interior's Standards for the Treatment of Historic Properties With Guidelines for the Treatment of Cultural Landscapes*. For purposes of Section 106, the determination of effect would be — **no adverse effect**.

- **Major — Adverse impact** - impacts would alter the overall cultural landscape or one or more of the significant landscape characteristics, diminishing the integrity of the landscape to the extent that its NRHP status or eligibility is jeopardized. For purposes of Section 106, the determination would be — **adverse effect**.

  Beneficial impact - restoration of the cultural landscape or one or more of the landscape characteristics in accordance with the *Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of Section 106, the determination of effect would be — **no adverse effect**.

  Duration:

  - **Short-Term** – The impact lasts less than three months.
  - **Long-Term** – The impact lasts three months or longer.

Treatment Alternative #1 No-Action Alternative

Analysis: Under the No Action Alternative, National Monument staff would continue to interpret the Ranger Cabin. The impacts on this historic structure from continued use would be both beneficial and adverse. The use of the cabin would help to educate visitors regarding the significance of the structure, and enable NPS staff to continuously enter the building and check its condition, resulting in a long term minor beneficial impact. Wear and tear from continued use would result in a long term

minor adverse impact to the structure. In this Alternative, the current fire protection sprinkler system would remain. The overall impact of this system is a long term moderate beneficial one. The system protects the building from interior fires, however, it could damage the structure unnecessarily if set off when not needed.

Portable toilets, parking, a drinking fountain, small seating area, and picnic area, would continue to serve as the main visitor facilities at the site. The historic site would be open to visitors to explore on their own, or to join an organized tour of the site and historic cave route. The incremental additions of the service driveways, employee parking, lantern shed, seating area, and drinking fountain would remain and continue to present a long term moderate adverse impact to the views and historic setting in the area immediately adjacent to the Ranger Cabin. The portable toilets would continue to have a long term moderate adverse impact on the character of the parking area—an important part of the arrival sequence to the historic site. Finally, this alternative would result in a moderate adverse impact to the upper and lower cave entrance trail and the CCC-constructed retaining wall, due to continued erosion problems. These include damage to the retaining wall and trails caused by storm water runoff during periods of intense rain. The water undermines the trails and strips the earth and vegetative cover from the CCC-constructed retaining wall.

Cumulative Impacts: The overall historic site would continue to present a somewhat confusing conglomeration of historic and non-historic structures and elements in the area. The presence of non-contributing elements that detract from the historic character of the site would continue to impact historic integrity and result in a cumulative long-term, minor, adverse impact.

Conclusion: The No-Action alternative would have an overall long-term moderate adverse impact on the historic landscape.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Treatment Alternative #2: Rehabilitation with Shuttle Transportation

Analysis: This treatment approach limits visitor access to the historic district, minimizing visitor use impacts to cultural resources. The two structures required to meet visitor and operational needs would be small and designed to complement the historic character of the Ranger Cabin. This new construction would have a long term minor adverse impact on views in the area of the Ranger Cabin and visitor parking lot. The addition of the structures paired with the removal of a number of non-contributing elements would have a long term moderate beneficial impact on the historic landscape. The alternative provides the opportunity of ensuring that all visitors to the historic site receive consistent information provided as part of a Ranger-led interpretive tour. This would have a long term minor beneficial impact on cultural resources.

However, many visitors to the Monument might never get to the historic site, and could miss the opportunity to experience the rustic character of the area that calls to mind the early development of the Monument and the Black Hills region. Visitors to the site would also be more constrained by limited opportunities to explore the site at their leisure. This could result in a long term moderate beneficial impact to the historic resources due to a lower quantity of use.

The treatment maximizes the site's ability to represent the CCC-period, while eliminating its ability to represent changes made over time by the NPS. Through removal of non-contributing elements (service drive A, enlarged parking, and others), representation of selected non-extant features with on-site designating elements (the ranger's tent and the CCC camp site), and reconstruction of selected non-extant

features (historic pedestrian trails), and restoration of others (the Ranger Cabin and access road), the site would be most representative of its ca. 1935-1942 conditions.

Cumulative Effects: The loss of historic fabric related to the NPS development of the site would reduce its ability to represent significant periods in its development. The addition of new structures would result in a long-term, minor adverse impact to overall cumulative impacts to cultural resources. There would be a long-term moderate beneficial impact on the historic resources because impacts from visitor use could be carefully monitored and controlled.

Conclusion: Treatment Alternative 2 would have a long-term, minor beneficial impact to cultural resources following the removal of the non-contributing elements, and resulting from limited visitor access. A short-term, negligible adverse impact would occur only during the construction of new facilities and the removal of non-contributing elements.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Treatment Alternative #3: Rehabilitation emphasizing Restoration within the Historic Core

Analysis: This treatment alternative provides a high level of integrity (based on the ca. 1940 period) of historic resources within the historic core area, while also allowing for flexible visitor access and adequate facilities to serve visitors and maintenance needs at the site. Although the construction of a new building at the site would involve moderate impacts to views from the Ranger Cabin, its location within the rehabilitation zone, and careful design to compliment the style of the Ranger Cabin, would prevent it from directly impacting the character of the historic core. The site chosen for this building is outside of the main view from the Ranger Cabin and the historic trail to the cave entrance. The use of vault toilets would eliminate potential impacts to the cave system however, they require frequent maintenance to control odor. The building would need to be designed to minimize the potential impacts of the odor.

Replacement of Service drive "A" with naturalistic vegetation would increase the quality of the historic setting in the area close to the Ranger Cabin. Use of the former campground site for visitor picnicking would create opportunities for interpreting the former NPS use of this site, and provide a high-quality picnic area.

Cumulative Impacts: Improvement of the condition of several historic landscape elements combined with the removal of non-contributing elements would increase the overall level of integrity of the historic landscape. Increasing the level of interpretation focusing on the historic landscape would heighten visitor's awareness of

this important cultural resource. This alternative would be long-term, minor, beneficial addition to the other cumulative actions.

Conclusion: Treatment Alternative 3 would provide a long-term, moderate beneficial impact to cultural resources. A short-term, negligible adverse impact would occur only during the construction of new facilities and the removal of non-contributing elements. There would be a long term beneficial impact to the historic site following the removal of the non-contributing elements.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Cave Resources

Basis for analysis: Impact analysis focused on the amount of disturbance to subsurface water quality, macrobiotic, and microbiotic resources in Jewel Cave beneath the historic district.

Intensity levels:

- **Negligible**—Impacts to park geologic features are not detectable based on standard scientific methodologies.
- **Minor**—Low probability of impact because either the activity would occur in an area or geologic layer not known to contain geologic features and the volume of disturbance would be negligible, or the activity would occur in an area or geologic layer containing geologic features but the volume of disturbance would be nearly indiscernible.

- **Moderate**— Moderate probability of impact because either the activity would occur in an area or geologic layer not known to contain geologic features and the volume of disturbance would be moderate, or the activity would occur in an area or geologic layer containing geologic features but the volume of disturbance would be small or moderate. Monitoring would identify most affected geologic features, but some features and/or associated contextual information would be lost.

- **Major**— High probability of impact because either the activity would occur in an area or geologic layer containing geologic features and the volume of disturbance would be large. Even with monitoring, many features and/or associated contextual information would likely be lost.

Duration:

- **Short-Term** – The impact lasts less than three months.

- **Long-Term** – The impact lasts three months or longer.

Treatment Alternative #1: No Action Alternative

Analysis: The only cave resources that could be impacted are water resources. The volume, distribution, and quality of water entering would remain the same. Monitoring of drip sites within the cave has shown no significant impact, except for high chloride concentrations (believed to be caused by the salting of nearby Highway 16 in the winter). Changes in volume of water entering the cave, and changes in distribution of water entering the cave – that may be caused by the present level of development – are unknown.

Cumulative Impact: Past relocation of the visitor center, park housing and supporting facilities, tended to reduce the potential for impact on water infiltrating from the surface to the cave. The direct result of this action was to reduce the amount of water running through buried water lines, the amount of sewage running through the buried septic system, and the amount of runoff from the roofs of buildings.

Normally-functioning water and septic systems pose no threat to known cave resources. Effluent from the drain field could affect underlying resources, however none are known in that area. Reducing the use of these utilities has resulted in a long-term minor beneficial impact by reducing the likelihood of leaking, and reducing the amount that would eventually leak. Removing man-made structures has had a long-term negligible beneficial impact to cave resources, because it did not result in detectable changes in water quality or distribution within the cave.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection; the chemicals constituting the foam are biodegradable, non-toxic, and were used in relatively low concentrations. Though no in-cave drip sites were sampled for contamination, it is the professional judgment of the cave resource staff that this resulted in a short-term negligible adverse impact to cave resources.

Past restoration of the cabin had resulted in the use of port-a-potties rather than the established sewer system. The only use of water at the cabin is occasional minor use of a kitchen sink. Normally-functioning water and septic systems pose no threat to cave resources, but their active use creates a potential for problems, because they eventually deteriorate and leak. Reducing the use of these utilities has resulted in a long term minor beneficial impact by reducing the likelihood of leaking, and reducing the amount that would eventually leak. The continued use of port-a-potties in the parking area would cause long-term negligible beneficial impact on cave resources.

Runoff from the highway carries winter road salt into the groundwater and has been detected inside the cave in the form of chloride concentrations that exceed drinking water standards. Future realignment of nearby US Highway 16 would move the highway away from the known cave and would result in a long-term moderate beneficial impact by allowing water entering the cave to return to natural chloride levels. The impacts of alternative 1 would be long term negligible and beneficial in comparison to this overall moderate beneficial cumulative impact.

Conclusion: Alternative 1, factoring in the impacts from cumulative actions would result in future long-term moderate beneficial impacts to cave resources.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Treatment Alternative #2: Rehabilitation with Shuttle Transportation

Analysis: The only cave resources that could be impacted are water resources. Changes in volume of water entering the cave, and changes in distribution of water entering the cave, would tend toward restoration of natural volumes and distributions.

Cumulative Impact: Past relocation of the visitor center, park housing and supporting facilities, tended to reduce the potential for impact on water infiltrating from the surface to the cave. The direct result of this action was to reduce the amount

of water running through buried water lines, the amount of sewage running through the buried septic system, and the amount of runoff from the roofs of buildings. Normally-functioning water and septic systems pose no threat to cave resources, but their active use creates a potential for problems, because they eventually deteriorate and leak. Reducing the use of these utilities has resulted in a long-term minor beneficial impact by reducing the likelihood of leaking, and reducing the amount that would eventually leak. Removing man-made structures has had a long-term negligible beneficial impact to cave resources, because it did not result in detectable changes in water quality or distribution within the cave.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection; the chemicals constituting the foam are biodegradable, non-toxic, and were used in relatively low concentrations. Though no in-cave drip sites were sampled for contamination, it is the professional judgment of the cave resource staff that this resulted in a short-term negligible adverse impact to cave resources.

Reestablishing restrooms at the cabin would result in treated effluent entering groundwater from the septic system, and would increase the likelihood of sewage entering the groundwater via leaks in the system. Normally-functioning water and septic systems pose no threat to cave resources, but their active use creates a potential for problems, because they eventually deteriorate and leak. This would result in a long-term minor adverse impact.

Runoff from the highway carries winter road salt into the groundwater; chloride concentrations exceeding drinking water standards are assumed to be from runoff

from Highway 16. Future realignment of US Highway 16 would move the highway away from the known cave and would result in a long-term moderate beneficial impact by allowing water entering the cave to return to natural chloride levels. The impacts of Alternative 2 would be long term minor and beneficial in comparison to this overall moderate cumulative impact.

Conclusion: Alternative 2, factoring in the impacts from cumulative actions would result in future long-term moderate beneficial impacts to cave resources.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Treatment Alternative #3: Rehabilitation emphasizing Restoration within the Historic Core

Analysis: The only cave resources that could be impacted are water resources. Changes in volume of water entering the cave, and changes in distribution of water entering the cave, would tend toward restoration of natural volumes and distributions.

Cumulative Impact: Past relocation of the visitor center, park housing and supporting facilities, tended to reduce the potential for impact on water infiltrating from the surface to the cave. The direct result of this action was to reduce the amount of water running through buried water lines, the amount of sewage running through

the buried septic system, and the amount of runoff from the roofs of buildings. Normally-functioning water and septic systems pose no threat to cave resources, but their active use creates a potential for problems, because they eventually deteriorate and leak. Reducing the use of these utilities has resulted in a long-term minor beneficial impact by reducing the likelihood of leaking, and reducing the amount that would eventually leak. Removing man-made structures has had a long-term negligible beneficial impact to cave resources, because it did not result in detectable changes in water quality or distribution within the cave.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection; the chemicals constituting the foam are biodegradable, non-toxic, and were used in relatively low concentrations. Though no in-cave drip sites were sampled for contamination, it is the professional judgment of the cave resource staff that this resulted in a short-term negligible adverse impact to cave resources.

Past restoration of the cabin had resulted in the use of port-a-potties rather than the established sewer system. This removed the possibility of sewage entering the cave through eventual leaks in the system, and significantly removed the amount of treated effluent leaving the septic tank. Future installation of vault toilets would continue to preclude the possibility of sewage entering the cave. This installation would require a small one-time permanent ground disturbance that would result in a short-term negligible adverse impact to cave resources if properly located away from surface drainages and in-cave drips sites. A small amount of runoff from the building area would result in long-term negligible adverse impact cave resources.

Runoff from Highway 16 carries winter road salt into the groundwater and has been detected inside the cave in the form of chloride concentrations that exceed drinking water standards. Future realignment of nearby US Highway 16 would move the highway away from the known cave and would result in a long-term moderate beneficial impact by allowing water entering the cave to return to natural chloride levels. The impacts of Alternative 3 would be long term, negligible and beneficial in comparison to this overall moderate cumulative impact.

Conclusion: Alternative 3, factoring in the impacts from cumulative actions would result in long-term moderate beneficial impacts to cave resources.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Surface Water Quality

Basis for Analysis: Impacts of the alternatives on surface water runoff related to pervious surfaces.

Intensity:

- **Negligible**—Impacts would not be detectable, would be well below water quality standards or criteria, and would be within historical or desired water quality conditions.

- **Minor**— Impacts would be detectable but would be well below water quality standards or criteria and within historical or desired water quality conditions.

- **Moderate**— Impacts would be detectable but would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions would be altered on a short-term basis.

- **Major**— Impacts would be detectable and would be frequently altered from the historical baseline or desired water quality conditions. Impacts would exceed water quality standards.

Duration:

- **Short-Term** – The impact lasts less than three months.

- **Long-Term** – The impact lasts three months or longer.

Treatment Alternative 1: No Action Alternative

Analysis: Except for occasional flash floods in Hell Canyon, no surface water is present in the immediate vicinity of the proposed action.

Cumulative Impact: Past relocation of park facilities, tended to reduce the potential for runoff and contamination of surface waters. This has resulted in long-term negligible beneficial impacts.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection; the chemicals constituting the foam are biodegradable, non-toxic, and were used in relatively low concentrations. This resulted in short-term negligible adverse impacts.

Continued use of port-a-potties in the developed parking lot area would result in no ground disturbance, no increase in runoff, and no potential to adversely impact the quality of surface water. This would result in short-term negligible adverse impacts.

Realignment of the highway would retain normal impacts (runoff and contamination), but move the points of discharge away from the historic area. This would result in long-term negligible beneficial impacts.

The impacts of alternative 1 would be negligible in comparison to the overall long-term negligible beneficial impact to surface water resources.

Conclusion: Alternative 1 would result in a long-term negligible beneficial impact on water quality, quantity and distribution.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Treatment Alternative #2: Rehabilitation with Shuttle Transportation

Analysis: No surface water is present in the immediate vicinity of the proposed action. Alternative 2 would reduce the effect of parking lot runoff infiltrating into the cave, but would increase the introduction of septic effluent into the ground water, via the extant septic system.

Cumulative Impact: Past relocation of park facilities, tended to reduce the potential for runoff and contamination of surface waters. This has resulted in long-term negligible beneficial impacts.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection; the chemicals constituting the foam are biodegradable, non-toxic, and were used in relatively low concentrations. This has resulted in short-term negligible adverse impacts.

Reestablishing restrooms at the cabin would result in no ground disturbance, no increase in runoff, and no potential to adversely impact the quality of surface water. This would result in short-term negligible adverse impacts.

Realignment of the highway would retain normal impacts (runoff and contamination), but move the points of discharge away from the historic area. This would result in long-term negligible beneficial impacts.

The impacts of alternative 2 would be negligible in comparison to the overall long-term negligible beneficial impact to surface water resources.

Conclusion: Alternative 2 would result in a long-term, negligible, beneficial impact on water quality, quantity and distribution. There could be negligible, adverse impacts to water quality, however these impacts would be short-term and only during the period of construction.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Treatment Alternative #3: Rehabilitation emphasizing Restoration within the Historic Core

Analysis: No surface water is present in the immediate vicinity of the proposed action. Alternative 3 would reduce the effect of parking lot runoff infiltrating into the cave, but would increase the introduction of septic effluent into the ground water, via the extant septic system.

Cumulative Impact: Past relocation of park facilities, tended to reduce the potential for runoff and contamination of surface waters. This has resulted in long-term negligible beneficial impacts.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection; the chemicals constituting the foam are biodegradable, non-toxic, and were used in relatively low concentrations. This has resulted in short-term negligible adverse impacts.

Constructing vault toilets would result in ground disturbance, no increase in runoff, and no potential to adversely impact the quality of surface water. This would result in short-term negligible adverse impacts.

Realignment of the highway would retain normal impacts (runoff and contamination), but move the points of discharge away from the historic area. This would result in long-term negligible beneficial impacts.

The impacts of alternative 3 would be negligible in comparison to the overall long-term negligible beneficial impact to surface water resources.

Conclusion: Alternative 3 would result in a long-term, negligible, beneficial impact on water quality, quantity and distribution. There could be negligible, adverse

impacts to water quality, however these impacts would be short-term and only during the period of construction.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Wildlife and Threatened and Endangered Species

Basis for Analysis: Impact analysis focused on the potential for terrestrial disturbance and visitor use patterns.

Intensity:

- **Negligible**—The effect is localized and not detectable or at the lowest levels of detection.
- **Minor**—The effect is localized and slightly detectable but would not affect overall structure of any natural community.
- **Moderate**—The effect is clearly detectable and could have an appreciable effect on individual species, communities, and/or natural processes.
- **Major**—The effect is highly noticeable, and would have a substantial influence on natural resources, including effects on individuals or groups of species, communities, and/or natural processes.

Duration:

- **Short-Term** – The impact lasts less than three months.
- **Long-Term** – The impact lasts three months or longer.

Treatment Alternative #1: No Action Alternative

Analysis: The present condition and use of the Historic area has no known impacts on any wildlife.

Cumulative Impact: Past relocation of park facilities, tended to reduce the number of visitors and vehicular use in the area, slightly improving wildlife habitat. This has resulted in long-term negligible beneficial impacts to wildlife.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection. This has resulted in short-term negligible beneficial impacts to wildlife.

Continued use of port-a-potties at the developed parking lot area would result in long-term negligible beneficial impacts to wildlife.

Realignment of the highway would move it farther away from the historic area and would have no impact on wildlife. This would result in long-term negligible beneficial impacts to wildlife.

The impacts of alternative 1 would be negligible in comparison to the overall long-term negligible beneficial impact on wildlife.

Conclusion: Alternative 1 would result in a long-term, negligible, beneficial impact on wildlife in the Historic area. There would be no effect to rare, threatened or endangered species and their habitats from this alternative.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3)

identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Treatment Alternative #2: Rehabilitation with Shuttle Transportation

Analysis: The present condition and use of the Historic area has no known impacts on any wildlife. However, any improvement of natural conditions (removing paved surfaces and restoring topography and vegetation) would improve natural habitat.

Cumulative Impact: Past relocation of park facilities, tended to reduce the number of visitors and vehicular use in the area, slightly improving wildlife habitat. This has resulted in long-term negligible beneficial impacts to wildlife.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection. This has resulted in short-term negligible beneficial impacts to wildlife.

Reestablishing restroom facilities at the cabin would result in long-term negligible beneficial impacts to wildlife.

Realignment of the highway would move it farther away from the historic area and would have no impact on wildlife. This would result in long-term negligible beneficial impacts to wildlife.

Conclusion: Alternative 2 would result in a long-term, negligible, beneficial impact on wildlife in the Historic area. There could be negligible, adverse impacts to wildlife common to the area, however these impacts would be short-term and only

during the period of construction. There would be no effect to rare, threatened or endangered species and their habitats from this alternative.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Treatment Alternative #3: Rehabilitation emphasizing Restoration within the Historic Core

Analysis: Improvement of natural conditions (removing paved surfaces and restoring topography and vegetation) will provide an improvement of natural habitat for wildlife.

Cumulative Impact: Past relocation of park facilities, tended to reduce the number of visitors and vehicular use in the area, slightly improving wildlife habitat. This has resulted in long-term negligible beneficial impacts to wildlife.

Historic area fire-fighting efforts related to the Jasper Fire of 2000 were limited to a one-time event of foaming the cabin for its protection. This has resulted in short-term negligible beneficial impacts to wildlife.

Future installation of vault toilets would result in a one-time negligible adverse impact on wildlife, because of construction activities.

Realignment of the highway would move it farther away from the historic area and would have no impact on wildlife. This would result in long-term negligible beneficial impacts to wildlife.

The impacts of alternative 3 would be negligible in comparison to the overall long-term negligible beneficial impact on wildlife.

Conclusion: Alternative 3 would result in a long-term, negligible, beneficial impact on wildlife in the Historic area. There could be negligible, adverse impacts to wildlife common to the area, however these impacts would be short-term and only during the period of construction. There would be no effect to rare, threatened or endangered species and their habitats from this alternative.

Impairment: Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Jewel Cave National Monument; (2) key to the natural or cultural integrity of the Monument; or (3) identified as a goal in the Monument's general management plan or other relevant National Park Service planning documents, there would be no impairment of the Monument's resources or values.

Impacts to Visitor Experience

Basis of Analysis: The analysis focuses on the effects of development proposals at the historic area. The driveway, parking lot, Ranger Cabin, and upper and lower trails to the cave entrance are all accessible to visitors. Impact analysis evaluated the ability of NPS staff to adequately provide information to visitors regarding the resources at Jewel Cave, and to interpret cultural and natural resources at the historic area.

Intensity levels:

- **Negligible –** a negligible effect would be a change that would not be perceptible or would be barely perceptible by most visitors.

- **Minor –** a slight change in a few visitor's experiences, which would be noticeable but which would result in little detraction or improvement in the quality of the experience.

- **Moderate –** a moderate effect would be a change in a large number of visitor's experiences that would result in a noticeable decrease or improvement in the quality of the experience. This would be indicated by a change in frustration level or inconvenience for a period of time.

- **Major –** a substantial improvement in many visitor's experience or a severe decrease in the quality of many visitor's experiences.

Duration of Impact:

- **Short-term –** Lasting only one visitor season.

- **Long-term –** Lasting multiple visitor seasons or essentially permanent changes in the landscape.

Treatment Alternative #1: No-Action Alternative

Analysis: Visitor use of the historic area at Jewel Cave National Monument would be expected to continue at current levels with the No-Action Alternative. The NPS staff would continue to provide interpreted tours for a fee, and the area would remain open to visitors for exploration during park operational hours. No improvements would be made to the cultural landscape and the historic area would continue to provide a confusing mix of historic resources related to several different periods of significance. The site would not provide adequate visitor services. The portable restrooms in the parking lot are unsightly and emit an unpleasant odor. The picnic areas are close to the cars and portable toilets, and there is no weather shelter.

Cumulative Impacts: The No-Action Alternative would cumulatively result in long-term, minor, adverse effects to visitor use and experience. For visitors who do

not take the historic cave tour, frustration from a lack of understanding of the site and its relationship to the overall Monument would continue. Also, visitor frustration due to the character and smell of the restroom facilities, and the close proximity of the portable toilets and parking to the picnic areas could limit the use of the site by visitors.

Conclusion: This alternative would result in a long-term, minor, adverse impact on visitor experiences at the site.

Treatment Alternative #2: Rehabilitation with Shuttle Transportation

Analysis: This treatment approach provides organized and limited visitor access by opening the site only to visitors who choose to pay to take the historic cave tour, or who hike in using the Canyons Trail. For visitors who choose to take the historic cave tour, this alternative would moderately increase the quality of their experience. By beginning the tour and interpretation at the visitor center, and transporting visitors to the historic site in a shuttle, the visitors would be provided with more information regarding the early development of the historic landscape. Also, the addition of two new visitor services structures at the historic site would add to visitor's satisfaction and comfort while at the site.

The removal of non-contributing elements would simplify the historic landscape, making it easier to understand and appreciate the CCC period, however, the removal of elements that relate to other periods of time would eliminate the landscape's ability to represent changes made over time by the NPS.

Although this alternative would provide a moderate improvement to the experience of visitors who take the historic cave tour, it would limit the opportunity for

visitors to enjoy the site at their own pace, or to picnic in the area, unless they hike in on the Canyons Trail. Visitors would no longer be able to drive to the site in their own vehicles, thus there would be a minor adverse effect to visitors.

Cumulative Impacts: Treatment Alternative 2 would cumulatively result in a minor beneficial impact to visitor use and experience. Visitor's understanding of the above-ground resources would be improved by increased access to interpreters while outside the cave, and by the simplification of the landscape. Also, the addition of new visitor facilities including vault restrooms and a weather shelter would help to keep visitors comfortable while at the site.

Conclusion: This alternative would result in a long-term, minor, beneficial impact on visitor experiences at the site. During a short period in which the shuttle system would be established, the alternative could have a moderate adverse impact on visitor experiences due to the potential for confusion for return visitors. There would be short-term, negligible, adverse impacts to visitor experience during the period of construction and removal of non-contributing elements.

Treatment Alternative #3: Rehabilitation emphasizing Restoration within the Historic Core

Analysis: Treatment alternative 3 provides the most visitor experience opportunities of any of the three alternatives. By establishing a shuttle system to augment the historic cave tour, this alternative would moderately increase the quality of visitor experience. The tour would begin at the visitor center, and visitors would be provided with more information regarding the early development of the historic

landscape. Also, the addition of a new visitor services structure at the historic site would add to visitor's satisfaction and comfort while at the site.

The entrance road and parking area for visitors would be open during park hours providing all Monument visitors with the opportunity to visit the historic area at their own pace, and to spend time enjoying the beautiful surroundings. The removal of selected non-contributing elements would also increase visitor satisfaction, by providing improved views and historic character within the historic core.

Cumulative Effects: Treatment Alternative 3 would cumulatively result in a moderate beneficial effect to visitor use and experience. Expanded visitor facilities at the site, an improved picnic area, and a more historically representative landscape would combine with the shuttle to the historic cave tour to provide multiple ways for visitors to enjoy the site.

Conclusion: Treatment alternative 3 would result in long-term, moderate improvements to visitor experiences. Short-term moderate, adverse impacts would occur during implementation of the shuttle system and minor adverse impacts during construction of the new building. However these potential impacts would only occur during the period of construction.

Socioeconomics

Basis of Analysis: Impact analysis focused on potential impacts to the local and regional economy from changes to visitor patterns, and additional contractor services.
Impact levels:

- **Negligible**— The effects would to the local or regional economy would at the lowest levels of detection or not measurable.

- **Minor**—The effects to socioeconomic conditions are localized and slightly detectable.
- **Moderate**—The effects to the socioeconomic conditions would be readily apparent. Any effects would result in changes to socioeconomic conditions at the local level.
- **Major**—The effects to the socioeconomic conditions would be highly noticeable, long-term, and would have a substantial impact to the regional community.

Duration:

- **Short-Term** – The impact lasts less than three months.
- **Long-Term** – The impact lasts three months or longer.

Treatment Alternative #1: No-Action Alternative

Analysis: Visitation is limited by the carrying capacity of the cave and staffing levels. Changes to the treatment of the historic area would have no direct effect on the local communities' overall population, income and employment base.

Cumulative Impact: Past relocation of park facilities resulted in a long term improvement in the Monument's ability to meet visitation demands. This resulted in a long-term minor beneficial impact on the socioeconomics of the area.

Firefighting resulted in short-term negligible beneficial impact.

Restoration of the cabin has enhanced the lantern tour, which may result in some minor increase in the number of visitors to the Monument and the region; however it would have a long-term negligible beneficial impact on socioeconomics.

Continued use of port-a-potties is a less desirable way to provide the needed services and would not result in new construction that could benefit local suppliers or contractors. This would result in a long-term negligible adverse impact on socioeconomics.

The realignment of the highway would result in no significant change to the Monument's activities, and would have a long-term negligible beneficial impact.

The impacts of alternative 1 would be negligible in comparison to this overall long-term minor beneficial impact.

Conclusion: Alternative 1 would result in long-term negligible beneficial impacts to the socioeconomics of the area.

Treatment Alternative #2: Rehabilitation with Shuttle Transportation

Analysis: Visitation is limited by the carrying capacity of the cave and staffing levels. Changes to the treatment of the historic area would have no direct effect on the local communities' overall population, income and employment base.

Cumulative Impact: Past relocation of park facilities resulted in a long term improvement in the Monument's ability to meet visitation demands. This resulted in a long-term minor beneficial impact on the socioeconomics of the area.

Firefighting resulted in short-term negligible beneficial impact.

Restoration of the cabin has enhanced the lantern tour, which may result in some minor increase in the number of visitors to the Monument and the region; however it would have a long-term negligible beneficial impact on socioeconomics.

Reestablishing restrooms at the cabin would result in new construction that could provide a short term negligible benefit to local suppliers or contractors only during the length of construction.

The realignment of the highway would result in no significant change to the Monument's activities, and would have a long-term negligible beneficial impact.

The impacts of alternative 2 would be negligible in comparison to this overall long-term minor beneficial impact.

Conclusion: Alternative 2 would result in long-term negligible, beneficial impacts to the socioeconomics of the area. The period of construction may result in a short-term negligible, beneficial impact to the local economy.

Treatment Alternative #3: Rehabilitation emphasizing Restoration within the Historic Core

Analysis: Visitation is limited by the carrying capacity of the cave and staffing levels. Alternative 3 could ultimately lead to the use of shuttle transportation, which could result in contracting the program to a local service provider.

Cumulative Impact: Past relocation of park facilities resulted in a long term improvement in the Monument's ability to meet visitation demands. This resulted in a long-term minor beneficial impact on the socioeconomics of the area.

Firefighting resulted in short-term negligible beneficial impact.

Restoration of the cabin has enhanced the lantern tour, which may result in some minor increase in the number of visitors to Jewel Cave and the region; however it would have a long-term negligible beneficial impact on socioeconomics.

Constructing vault toilets at the parking lot would result in new construction that could benefit local suppliers or contractors and provide a short term negligible benefit to the local economy only during the length of construction.

The realignment of the highway would result in no significant change to the Monument's activities, and would have a long-term negligible beneficial impact.

Conclusion: Alternative 3 would result in negligible long-term negligible beneficial impacts to the socioeconomics of the area. The period of construction may result in a short-term negligible, beneficial impact to the local economy.

Solid Waste

Basis of Analysis: Impact analysis focused on the amount of solid waste and the ability to recycle or reduce solid waste outputs.

Intensity levels:

- **Negligible –** Impacts would be at or below the level of detection. No long-term increases or decreases of the solid waste stream would be detected.
- **Minor –** Increases or decreases to the solid waste stream would be slight and likely short-term. Any impacts would be small and the initiatives applied or mitigation measures used would be inexpensive and/or simple to implement.
- **Moderate –** Increases or decreases to the solid waste stream would be apparent and could be either short or long-term. Impacts would result in changes to the solid waste stream on a local scale. Any initiatives applied or mitigation measures used could require some funding, but would be relatively simple to implement.
- **Major –** Increases or decreases to the solid waste stream would be readily apparent and long-term. Major impacts would have the potential to affect the regional solid waste stream. Any initiatives applied or mitigation measures used would be expensive and complex.

Duration:

- **Short-Term** – The impact lasts less than three months.
- **Long-Term** – The impact lasts three months or longer.

Treatment Alternative #1: No Action Alternative

Analysis: The No Action Alternative would maintain the existing status quo at Jewel Cave. No changes in the solid waste stream are anticipated. This alternative would not require any large scale removal of construction debris from removing

Service drive "A" or realignment of the hiking trail. Service drive "A" would continue to provide access for NPS staff and maintenance vehicles. Access to the small parking area for NPS employees only and the small structure used for storing lanterns would remain in this alternative. The No Action Alternative would have a long-term, negligible, beneficial impact on the solid waste system at the Monument.

Cumulative Impacts: Cumulative impacts resulting from the improvements to Highway 16 or the construction of a new restroom facility at Jewel Cave may have short-term, minor, adverse impacts, but long-term, negligible beneficial impacts on the solid waste stream in and around the park during construction.

Conclusion: The No Action Alternative would have long-term, negligible, beneficial impacts.

Treatment Alternative #2: Rehabilitation with Shuttle Transportation

Analysis: Alternative 2 calls for service drive "A" and its associated parking lot to be removed; resulting in the removal of about 4, 000 square feet (SF) of asphalt and gravel. Any bulk waste would be taken to the Rapid City Landfill site. Alternative 2 also calls for the realignment and resurfacing of the pedestrian trail. This action would involve the removal of roughly 1,600 SF of a combination of gravel and concrete. This would have a short-term, moderate, adverse, impact on the park's waste stream. The landfill would be able to recycle the majority of the material from service drive "A" and the trail, thus minimizing the impacts of its removal.

Cumulative Impacts: Cumulative impacts resulting from the improvements to Highway 16 or the construction of a new restroom facility at the Monument may

have short-term, minor, adverse impacts, but long-term, negligible adverse impacts on the solid waste stream in and around the park during construction.

Conclusion: Alternative 2 would have a short-term, minor, adverse impact; however, any long-term adverse impacts would be negligible.

Treatment Alternative #3: Rehabilitation emphasizing Restoration within the Historic Core

Analysis: Alternative 3 calls for service drive "A" and its associated parking lot to be removed; resulting in the removal of about 4, 000 square feet (SF) of asphalt and gravel. Any bulk solid waste would be taken to the Rapid City Landfill site. Alternative 3 also calls for the realignment and resurfacing of the pedestrian trail. This action would involve the removal of roughly 1,600 SF of a combination of gravel and concrete. This would have a short-term, moderate, adverse, impact on the park's waste stream. The landfill would be able to recycle the majority of the material from service drive "A", thus minimizing the impacts of its removal.

Cumulative Impacts: Cumulative impacts resulting from the improvements to Highway 16 or the construction of a new restroom facility at the Monument may have short-term, minor, adverse impacts, but long-term, negligible adverse impacts on the solid waste stream in and around the park during construction.

Conclusion: Alternative 3 would have a short-term, minor, adverse impact; however the long-term adverse impacts would be negligible.

Utilities

Basis for Analysis: Impact analysis focused on impacts to on-site utilities.

Intensity levels:

- **Negligible**—The effect is at the lowest levels of detection or not measurable.
- **Minor**—The effect is localized and slightly detectable.
- **Moderate**—The effect is clearly detectable and appreciable.
- **Major**—The effect is highly noticeable, and would have a substantial impact to the utility system.

Duration:

- **Short-Term** – The impact lasts less than three months.
- **Long-Term** – The impact lasts three months or longer.

Treatment Alternative #1: No Action Alternative

Analysis: Alternative 1 would have a negligible effect on the utilities.

Cumulative Impact: Past relocation of park facilities resulted in removal of some overhead power and phone lines and buried phone, and of some buried water and sewer lines. Because there is no current need for any of the removed utilities, this is a long-term negligible beneficial impact.

Firefighting efforts in 2000 resulted in short-term negligible beneficial impact.

Restoration of the cabin resulted in long-term negligible beneficial impact.

The continued use of port-a-potties in the parking area would result in no change to the current utilities, resulting in long-term negligible beneficial impact.

Realignment of the highway would result in long-term negligible beneficial impact.

The impacts of alternative 1 would be negligible in comparison to this overall long-term negligible beneficial impact.

Conclusion: Alternative 1 would result in long-term negligible, beneficial impacts to the park utilities.

Treatment Alternative #2: Rehabilitation with Shuttle Transportation

Analysis: Alternative 2 would have no effect on the utilities.

Cumulative Impact: Past relocation of park facilities resulted in removal of some overhead power and phone lines and buried phone, and of some buried water and sewer lines. Because there is no current need for any of the removed utilities, this is a long-term negligible beneficial impact.

Firefighting efforts in 2000 resulted in short-term negligible beneficial impact.

Restoration of the cabin resulted in long-term negligible beneficial impact.

Reestablishing restrooms at the cabin would result in more use of existing water and sewer lines, with a long-term negligible adverse impact from heavier use.

Realignment of the highway could result in a long-term negligible adverse impact.

The impacts of alternative 2 would be negligible in comparison to this cumulative long-term, negligible, beneficial impact.

Conclusion: Alternative 2 would result in long-term, negligible, beneficial impact to the park utilities.

Treatment Alternative #3: Rehabilitation emphasizing Restoration within the Historic Core

Analysis: Retaining the drinking fountain would result in no impact. The existing fire suppression system would remain, affording significant protection from a structural fire. Vault toilets would be a significant improvement over the port-a-potties presently used.

Cumulative Impact: Past relocation of park facilities resulted in removal of some overhead power and phone lines and buried phone, and of some buried water and sewer lines. Because there is no current need for any of the removed utilities, this is a long-term negligible beneficial impact.

Firefighting efforts in 2000 resulted in short-term negligible beneficial impact.

Restoration of the cabin resulted in long-term negligible beneficial impact.

A vault toilet in the parking lot area would be a permanent replacement for the temporary port-a-potties currently in use, and would result in a long-term negligible adverse impact on utilities.

Realignment of the highway would result in long-term negligible beneficial impact.

The impacts of alternative 3 would be negligible in comparison to this overall long-term, negligible, beneficial impact.

Conclusion: Alternative 3 would result in long-term, negligible, beneficial impacts to the park utilities.

Summary of Environmental Consequences

The analysis of each alternative is summarized in Table 5.

Table 5
Impact Comparison Matrix

Resource Area	Treatment Alternative I No Action Alternative	Treatment Alternative II	Treatment Alternative III
Cultural Resources	• Long-term minor, adverse cumulative impacts. • Long-term moderate, adverse impacts. • No impairment to Monument resources.	• Long-term minor, adverse cumulative impacts. • Short-term negligible, adverse impact. • Long-term minor, beneficial impacts. • No impairment to Monument resources.	• Long-term minor, beneficial cumulative impacts. • Short-term negligible, adverse impact. • Long-term moderate, beneficial impacts. • No impairment to Monument resources.
Cave Resources	• Long-term moderate, beneficial cumulative impact. • Long-term moderate, beneficial impact. • No impairment to Monument resources.	• Long-term moderate, beneficial cumulative impact. • Long-term moderate, beneficial impact. • No impairment to Monument resources.	• Long-term moderate, beneficial cumulative impact. • Long-term moderate, beneficial impact. • No impairment to Monument resources.
Surface Water Quality	• Long-term negligible, beneficial cumulative impact. • Long-term negligible, beneficial impact. • No impairment to Monument resources.	• Long-term negligible, beneficial cumulative impact. • Short-term negligible, adverse impact. • Long-term negligible, beneficial impact. • No impairment to Monument resources.	• Long-term negligible, beneficial cumulative impact. • Short-term negligible, adverse impact. • Long-term negligible, beneficial impact. • No impairment to Monument resources.

Table 5 (cont.) Impact Comparison Matrix			
Resource Area	**Treatment Alternative I No Action Alternative**	**Treatment Alternative II**	**Treatment Alternative III**
Wildlife	• Long-term negligible, beneficial cumulative impact. • Long-term negligible, beneficial impact. • No effect to listed species. • No impairment to Monument resources.	• Long-term negligible, beneficial cumulative impact. • Short-term negligible, adverse impact. • Long-term negligible, beneficial impact. • No effect to listed species. • No impairment to Monument resources.	• Long-term negligible, beneficial cumulative impact. • Short-term negligible, adverse impact. • Long-term negligible, beneficial impact. • No effect to listed species. • No impairment to Monument resources.
Visitor Use and Experience	• Long-term minor, adverse cumulative impact. • Long-term minor, adverse impact.	• Long-term minor, beneficial cumulative impact. • Short-term negligible and moderate, adverse impacts. • Long-term minor, beneficial impact.	• Long-term moderate, beneficial cumulative impact. • Short-term minor and moderate, adverse impacts. • Long-term moderate, beneficial impact.
Socioeconomics	• Long-term negligible, beneficial cumulative impact. • Long-term negligible, beneficial impact.	• Long-term negligible, beneficial cumulative impact. • Short-term negligible, beneficial impact. • Long-term negligible, beneficial impact.	• Long-term negligible, beneficial cumulative impact. • Short-term negligible, beneficial impact. • Long-term negligible, beneficial impact.

Table 5 (cont.) Impact Comparison Matrix			
Resource Area	**Treatment Alternative I No Action Alternative**	**Treatment Alternative II**	**Treatment Alternative III**
Solid Wastes	• Short-term minor, adverse cumulative impacts. • Long-term negligible, beneficial cumulative impact. • Long-term negligible, beneficial impact.	• Short-term minor, adverse cumulative impacts. • Long-term negligible, adverse, cumulative impacts. • Short-term, minor adverse impact. • Long-term negligible, adverse impact.	• Short-term minor, adverse cumulative impacts. • Long-term negligible, adverse, cumulative impacts. • Short-term minor, adverse impact. • Long-term negligible, adverse impact.
Utilities	• Long-term negligible, beneficial cumulative impact. • Long-term negligible, beneficial impact.	• Long-term negligible, beneficial cumulative impact. • Long-term negligible, beneficial impact.	• Long-term negligible, beneficial cumulative impact. • Long-term negligible, beneficial impact.

Mitigating Measures

If previously unknown and significant archeological resources are unearthed during construction, work would be stopped in the area of discovery and the NPS would consult with the South Dakota State Historic Preservation Office (SHPO) and as appropriate, the Advisory Council on Historic Preservation. If impacts to significant resources could not be avoided by redesign, mitigating measures would be developed in consultation with the SHPO to help ensure that the informational significance of the sites would be preserved. If appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990 would be implemented.

The use of NPS Best Management Practices (BMPs) would minimize short-term and long-term adverse impacts to water quality.

Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested in NEPA, which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "…the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101." Using the six criteria from Section 101 detailed below.

- ***Criterion 1***—*Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.*
- ***Criterion 2***—*Assure for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings.*
- ***Criterion 3***—*Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.*
- ***Criterion 4***—*Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.*
- ***Criterion 5***—*Achieve a balance between population and resource use that will permit high standards of living and wide sharing of life's amenities.*

- ***Criterion 6***—*Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.*

After analysis of potential impacts for each Treatment Alternative it was determined that Treatment Alternative #3— Rehabilitation emphasizing Restoration within the Historic Core provides the greatest level of protection of resources of the Treatment Alternatives evaluated in this CLR/EA. Treatment Alternative #3 is the environmentally preferred alternative because implementation of this alternative would further protect all elements of the cultural landscape for future generations; improve visitor's experience and understanding of the cultural landscape and promotes a "…safe, healthful, productive, and aesthetically and culturally pleasing surroundings. This alternative also integrates resource protection opportunities, which "preserves important, historic, cultural and natural aspects of our natural heritage".

Chapter VIII:
Recommended Treatment (Preferred Alternative)

Recommended Treatment (Alternative #3): Rehabilitation emphasizing Restoration within the Historic Core

The purpose of this recommended treatment is to preserve and interpret extant historic resources, while improving visitor services. The overall management philosophy would be rehabilitation, with restoration, preservation, and rehabilitation applied to selected elements. A vault toilet building and a shelter/lantern storage building would be constructed to improve visitor comfort and remove impacts from the historic core. A shuttle system would be developed to augment visitor experiences and access to the site. The site would remain open to visitors to access and explore during the Monument's operational hours.

This alternative treatment plan consists of five management zones including; 1) Historic Core, Historic Resource Management and Interpretation Zone, 2) Historic Resource Management and Visitor Services Zone, 3) Archeological Resource Management Zone, 4) Park Operations Management Zone, 5) Ponderosa Pine Forest Preservation Zone. The general treatment approach associated with each of these zones is summarized in Chapter VI, Treatment Alternatives. This chapter includes more specific treatment recommendations for resources.

Historic Core, Recommended Treatment

The *Historic Core, Historic Resource Management and Interpretation Zone,* includes the Ranger Cabin, the landscape associated with the Ranger Cabin, upper and lower trails to the cave entrance, the stone stairway, retaining walls, and cave entrance, as illustrated in Figures 8.1 and 8.2. All of these historic resources retain a high level of integrity.

- Preserved or rehabilitate cultural resources as necessary to maintain them in good condition and ensure visitor safety.
- Manage the ponderosa pine forest that constitutes the main vegetative resource within the zone according to natural resource goals for the overall Monument.
- Remove or relocate non-contributing elements within the core to a site outside of the historic core. These include the lantern storage shed, Service Drive 'A' and employee parking area, rocks at the edge of the parking area, drinking fountain, and circular seating area near the cabin.
- Continue to conduct guided tours within the Historic Core as the first portion of the historic cave tour.
- Keep the area open for use by visitors for informal explorations of the cultural landscape; however, continue to keep the Ranger Cabin and historic cave entrance accessible only in the presence of NPS staff.

Development of designs and implementation of design treatments at this site reflect the spirit of the rustic park style embraced by the National Park Service and the Civilian Conservation Corps in the 1920s and 1930s, and strive to achieve maximum landscape protection and harmonious design. While proposed elements do not strive to look like the historic resources, they are designed in a manner that achieves unity of historic and new structures as well as natural and human-built features. Use of native materials and proportions, emphasis on views, and the application of textures and workmanship that correspond to the surrounding forest and geology are emphasized with all the design solutions recommended for the historic district.

Ranger Cabin:

- Maintain in its recently restored ca. 1940s condition.
- Retain the fire protection system and follow recommendations presented in the HSR.

Landscape directly associated with the Ranger Cabin:

- Maintain the area around the building as a low maintenance, unadorned landscape.
- Maintain the existing Junipers at the front and north side of the cabin. When these plants are no longer healthy or thriving, replace them with Juniperus horizontalis plants to create an even massing.
- Recondition the soil in the area in front of the building, and plant three more Juniperus horizontalis to create a massed planting. To recondition the soil, send soil samples to the nearest Agricultural Extension lababratory to determine the existing condition of the soil and to obtain instructions for enhancing the soil for evergreen shrubs. Carefully dig up the soil in the area (avoiding the roots of the existing shrubs). Using a hand shovel, mix in any organic matter or other additives suggested by the soil laboratory. Replace the soil ensuring that the surface will drain away from the building and the plants. The plants require a very well drained environment. Install the new plants being careful not to damage the plants and removing all packaging (container or burlap). The Juniperus horizontalis prefer a moderately acid to circumneutral soil, but will tolerate alkaline conditions with pH between 5.0-8.5.

- Discourage use of the social trail on the northern side of the building.
- Disguise the trail head with brush, and discourage NPS staff from using the trail.
- Continue to maintain one picnic table on the western side of the building.
- Remove the driveway and establish native ground cover consisting of grasses and forbs.

Upper Trail to Cave Entrance:

- Repave the trail using tinted concrete with a rough broom finish. The tint should be a light tan or gray that corresponds with the color of the natural rock outcrops.
- Conduct a detailed survey of existing conditions and grades at the site, and prepare construction documents. Construction documents are necessary to ensure that the trail and steps are built according to the intended design. The topography and drainage, as well as the design of the steps, are of particular concern, requiring a site survey and detailed grading and layout plan.
- Layout the trail route based on the historic alignment as closely as possible while relating the alignment to the natural topography by using gentle curves, and avoiding unnatural bends.
- To minimize grading along the route meet the existing land as quickly and naturally as possible.

- Reinforce any disturbed land with a temporary erosion control mesh and plant native ground cover species along the edges of the trail.
- Carefully address any potential erosion problems near the trail by ensuring that the trail surface drains adequately and does not create an obstruction to water flow.
- Grade the trail to ensure a safe approach to the historic stone stairway. Avoid grades greater than eight percent.
- If it is necessary to use steps along the trail, reuse the stone from the existing steps along the upper trail. Carefully position the stones to create a uniform rise-run ratio for all of the steps. Utilize a ratio that includes a minimum tread of twelve inches, and a minimum riser of seven inches. Install steps in groups of two or three whenever possible. Do not install a single step in any location, as this creates a tripping hazard.
- Use a tinted concrete with a rough broom texture finish for the surface to repave the trail. The concrete tint should be a light tan or gray in a hue that is similar to the native stone at the site.
- In the area just above the CCC-constructed stone stairway, the sidewalk is being undercut by erosion (see Figure 8.8). Construct a retaining wall to support the path. Use native stone in a naturalistic pattern as indicated in Figures 8.6 and 8.7. Consider extending the retaining wall thirty inches above the concrete sidewalk to create a guardrail as illustrated in Figure 8.6. Alternately, construct the retaining wall only

below the sidewalk and reuse the existing metal railing with the new pavement (see Figure 8.7).

- Remove non-contributing elements along the trail including the drinking fountain and the circular seating area. Once these elements have been removed, spread local topsoil and reestablish native vegetation in these areas.

Lower Trail to Cave Entrance:

- Repave the trail using tinted concrete with a rough broom finish. The tint should be a light tan or gray that corresponds with the color of the natural rock outcrops.
- Conduct a detailed survey of existing conditions and grades at the site, and prepare construction documents to ensure proper erosion control. Construction documents are necessary to ensure that the trail and steps are built according to the intended design. The topography and drainage, as well as the design of the steps, are of particular concern, requiring a site survey and detailed grading and layout plan.
- Remove the existing pavement. Relate the trail alignment to the existing topography, and avoid unnatural bends using gentle curves that respond to the adjacent rock outcrop.
- Use of grading along the route should focus on meeting existing grades, and achieving a sufficient cross slope for the pavement (between one and two percent) to allow for positive drainage away from the rock outcrop. Reinforce any disturbed land with a temporary erosion control mesh and

plant native ground cover species along the edges of the trail. Carefully address any potential erosion problems near the trail by ensuring that the trail surface drains adequately and does not create an obstruction to water flow.

- Use a tinted concrete and rough broom finish (matching that used for the upper trail) to repave the trail.

CCC-Constructed Stone Stairway

- Preserve the stone stairway and monitor its condition (Figure 8.10).
- Retain the existing handrail.
- Consider constructing a short stone structure at the base of the stairway to create a safer transition from the stairs to the lower trail (see Figure 8.11). This area currently has a steep drop-off that could be dangerous for visitors (see Figure 8.10) .
    - Regrade the area near the steps to create a stable shelf.
    - Place large stones that match the rock outcrop along the edge of the steps in a naturalistic arrangement.
    - Plant native shrubs at the edge of the rocks to increase soil stability and to help blend the new rocks with the existing rock outcrop.

NPS-Constructed Retaining Wall along high side of the Lower Trail

- This stone retaining wall is being impacted by erosion and structural failure in sections. Consider conducting a structural evaluation of the retaining wall and preparing a comprehensive erosion control plan for the slopes above this wall. If the plan indicates that the wall should be

removed and replaced with another structure, use construction materials and details that are consistent with the CCC-designed resources at the site.

- If a structural evaluation and comprehensive erosion control plan cannot be conducted, apply the following measures.
- Create an erosion-resistant surface on the slope above the retaining wall.
- Grade areas where erosion occurs to create a more smooth area for storm water run-off by eliminating any channels or ditches that have developed. Install erosion control mats and re-establish vegetation.
- Monitor the condition of the slope and promptly repair areas that display erosion problems. In particular, monitor areas where the slope exceeds thirty percent. If possible, regrade these areas to achieve a slope of less than thirty percent.
- In addition, repair sections of the stone retaining wall that have been damaged. Remove the sections of the wall that are failing and reconstruct using sound engineering principles.
- Finally, consider installing a perforated drain pipe along the back side of the wall to eliminate the accumulation of water. Slope the pipe to achieve positive drainage, and install it under the new sidewalk. Daylight the drain below the sidewalk base using an erosion-resistant outlet. Ensure that the outlet is not visible to people on the path or in Hell Canyon.

CCC-Constructed Retaining Wall below the Lower Trail

- There are areas where the stone wall has become exposed (the entire wall was originally covered by earth fill and vegetation) due to damage from surface drainage. Consider conducting a structural evaluation of the CCC-constructed retaining wall and preparing a comprehensive erosion control plan for the slopes above and below the lower trail to the cave entrance.
- If a structural evaluation and comprehensive erosion control plan cannot be conducted, the following measures should be applied.
- In areas where the CCC-constructed stone retaining wall has become exposed, restore the finished grade using fill dirt and install erosion control mats to re-establish vegetation.
- Monitor the condition of the slope and promptly repair areas that display erosion problems. In particular, monitor areas where the slope exceeds thirty percent. If possible, regrade these areas to achieve a slope of less than thirty percent.

Cave Entrance

- Maintain the cave entrance including the opening and the gate.
- Retain the log bench near the entrance.

Rock Outcrop adjacent to the Cave Entrance

- Monitor the rock outcrop for safety hazards. If dangerous conditions develop, resolve them on a case by case basis.

- For instance, if portions of rocks become loose and potentially hazardous, remove them. Avoid creating opportunities for more dangerous situations to develop. If removal of rocks is necessary carefully consider the appearance of the natural rock formation and avoid creating an unnatural appearance. For instance, use natural break lines rather than sheer cuts to remove dangerous portions of rock.
- Whenever possible, use hand tools to remove stone to limit visible traces of manipulation. Observe the natural pattern and character of the stone and ensure that the outcrop maintains this character when the work is complete. Avoid imitating the pattern of the CCC-developed and NPS-developed retaining walls at the site. Although the CCC-developed walls provide a useful template for repairs or additional retaining wall construction, they are not appropriate in addressing the rock outcrop that has retained its naturalistic appearance. Consider consulting a mason with experience working on similar projects, and/or reference guides including *Lightly on the Land*.[1]

Visitor Services Area, Recommended Treatment

The *Historic Resource Rehabilitation Zone* includes the park entrance road and parking areas, reconstructed historic area entrance sign, the northern-most portion of Service Drive "B," and the site of the former NPS campground.

[1] Birkby, Robert C. 1996. *Lightly on the Land: The SCA Trail-Building and Maintenance Manual* (Seattle, Washington: The Mountaineers). Chapter Twelve, *Building With Rock*, provides practical and detailed guidance for hand rock manipulation methods.

- Within this zone, interpret the sites of non-extant historic elements (including the ranger's tent site, the CCC camp site, NPS housing and administrative area, and the NPS campground site). Interpretation should be consistent with the Monument's Interpretive Prospectus.
- Provide selected visitor services including parking, restrooms, drinking fountain, a weather shelter/waiting area for interpretive programs, a lantern storage facility, limited interpretive signs, a picnic area, and hiking trails.

EXISITNG ELEMENTS:

Historic area entrance road/Entrance sign/Gate

- Provide seasonal maintenance for the road and associated drainage structures.
- Maintain the gate and reconstructed entrance sign at the entrance to the historic area.
- Continue to keep the historic area entrance road open to visitors during the park's operational hours.

Visitor parking area

- Maintain the existing parking lot and add a shuttle drop-off area as indicated in Figures 8.1 and 8.4.

The northern-most portion of Service Drive "B"

- Maintain service drive "B" for access to employee parking and the pump building.

Site of the former NPS campground/Proposed Picnic Area

- Utilize this area for a visitor picnic area.
- Install picnic tables and trash receptacles.

Site of the non-extant CCC-Camp:

- Include information about the site in the ranger's introduction to the historic area.

PROPOSED ELEMENTS:

Shelter / Storage Building

- Develop a small visitor-services building including an exterior shelter and lantern storage facility near the parking lot and the site where the portable toilets are now located.
- Remove the existing lantern storage shed.
- Transfer lantern storage to the new visitor services building storage area.
- Remove the circular visitor waiting/seating area (currently located near the lantern storage shed and Service drive "A") and transfer this function to the shelter at the new visitor services building.

Drinking Fountain

- Remove the drinking fountain from its current location and provide a new drinking fountain near the new visitor services shelter.

Vault Toilet Building

- Construct a small building for two vault toilets. See Figure 8.6 for building design. Consider providing a wood screen fence at the front of the building.

Interpretive/Information Sign

- Consider installing a sign near the shelter explaining a brief history of the site, and explaining that tickets for the historic cave tour must be purchased at the main visitor center.

Former Employee Housing Area

- Remove remaining gravel and other building-related materials.
- Restore topography to natural contours.
- Recondition the soil and restore native vegetation. To recondition the soil, dig and rake surface to remove non-natural materials such as gravel and building materials. Replace cleaned soil and compact. Install erosion control fabric if necessary to stabilize portions of the soil until vegetation becomes established. Consider seeding with native plant seeds and/or planting Pondarosa pine seedlings.
- Install a picnic table for employees within the former housing area, in a site that is screened from visitor's view.

Archeological Resources Zone, Recommended Treatment

The *Archeological Resources Management Zone* encompasses the area near Highway 16 where the non-extant Michaud hotel and associated resources were located. The site currently includes the stone foundation of the hotel building and the CCC-constructed manhole at the spring. An Archeological Overview is currently being prepared for the area by Bruce Jones of the Midwest Archeological Center and the

production of the final report is in progress. Recommendations in this CLR/EA will defer to recommendations in that report when it is completed. In the meantime,

- monitor the site for impacts by vandals or natural forces, and interpret it as a representative of the early developments at the historic area by the Michaud group.
- Provide interpretation through staff presentations as part of the historic cave route tour.
- No visitor access to the site is recommended.

Park Operations Zone, Recommended Treatment

The *Park Operations Zone* includes the southeastern portion of Service drive "B," the pump building, and Service drive "A."

Southeastern Portion of Service Drive "B"

- Maintain the driveway and building for use by NPS staff.
- Utilize the driveway for employee parking and maintenance access to the building.
- Maintain the pump building.

Service Drive "A"

- Remove service drive "A" and the employee parking area.
- Remove the pavement along Service drive "A" and establish native vegetation in the areas of pavement removal.
- Maintain a two-track drivable surface from the loop road to the cabin for use by emergency vehicles.

- If, in the future, it is determined that this access for emergency vehicles is not required, consider restoring the road grade to its original topography, and also restoring of the native vegetation in the area.

Natural Resources Management Zone, Recommended Treatment

The *Natural Resource Management Zone* includes the remaining land within the proposed historic district boundary. Cultural resources within this zone include the Hell Canyon Road, and two archeological sites in Hell Canyon.

- Maintain the Hell Canyon Road as a fire access road. Maintain the road by mowing and repairs when necessary.
- Consider interpreting the use of the road for early access to the area (staff presentations or a trail brochure could be used).
- Manage the archeological resources in this zone according to the recommendations of the Archeological Report that is currently being prepared by Bruce Jones of the Midwest Archeological Center.
- Natural resources within the zone include Ponderosa Pine forest. Manage the forest according to natural resource management goals for the overall Monument.
- Adhere to recommendations in the Fire Management Plan for the Monument which provides guidelines regarding treatment for the forest.

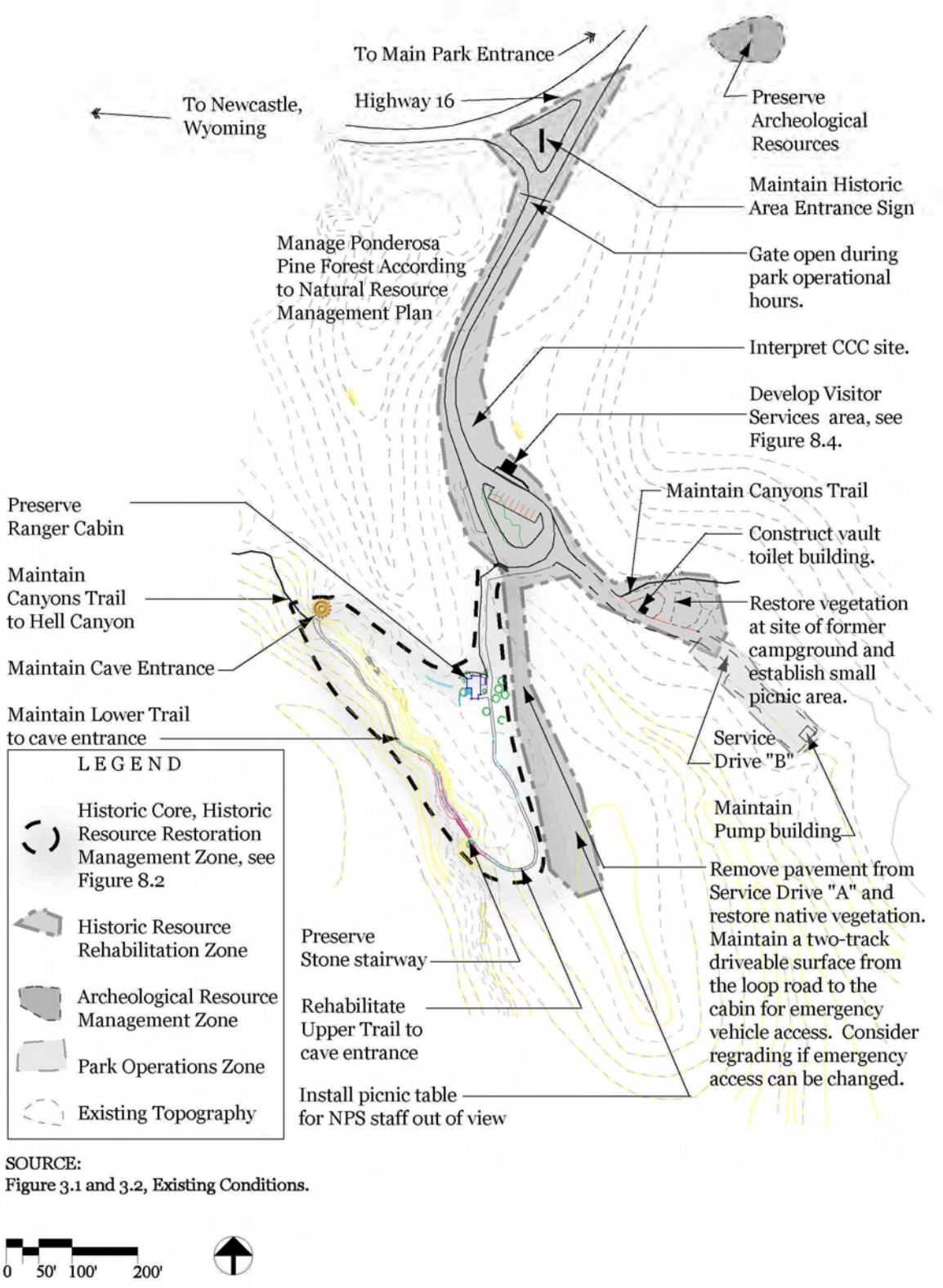
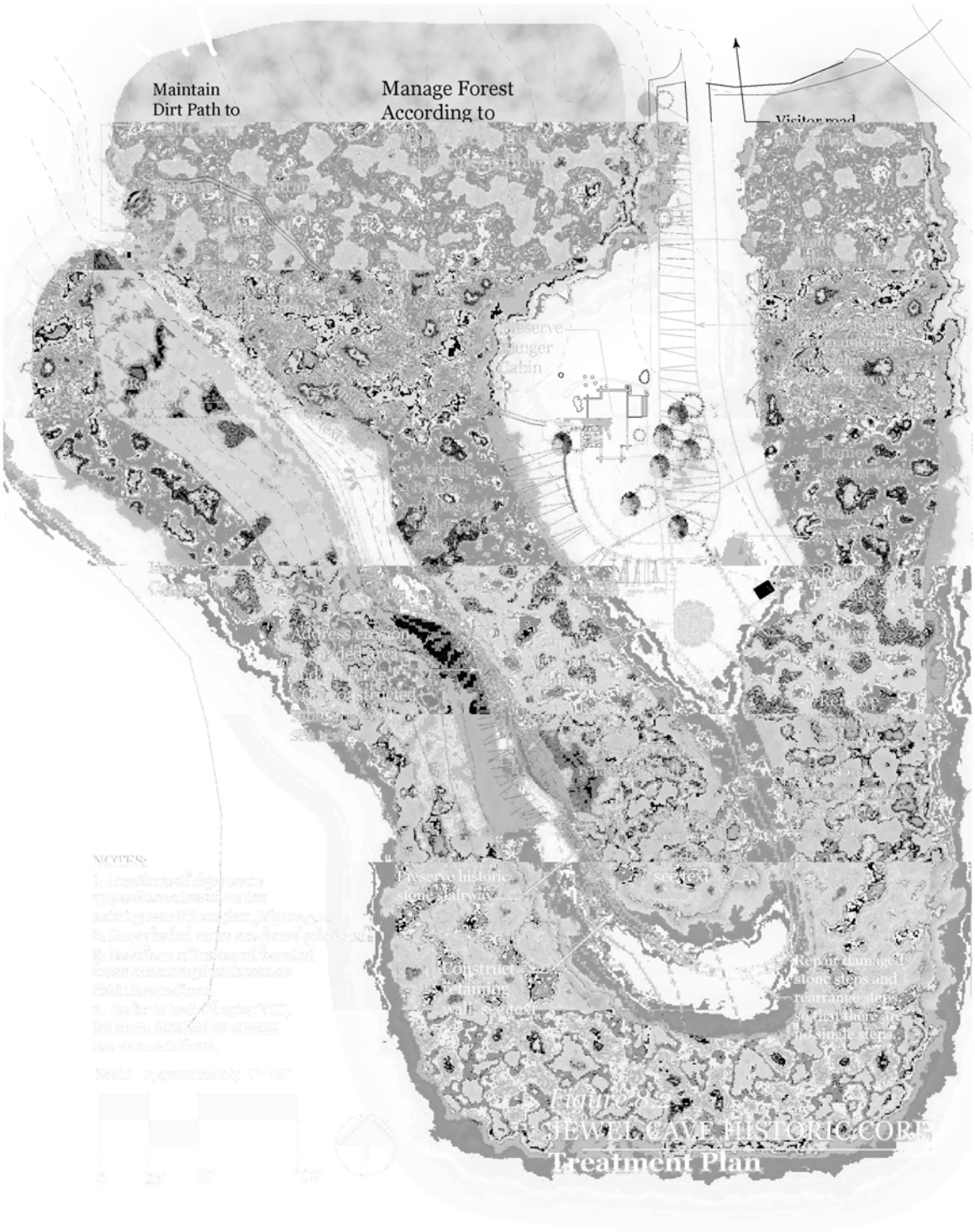


Figure 8.1: Recommended Treatment Management Zones


Maintain
Dirt Path to
Manage Forest
According to
Visitor road
Preserve
Ranger
Cabin
Address erosion
Preserve historic
stone fairway
Reconstruct
retaining
wall
Repair damaged
stone steps and
rearrange steps
to
Figure 9
JEWEL CAVE HISTORIC CORE
Treatment Plan

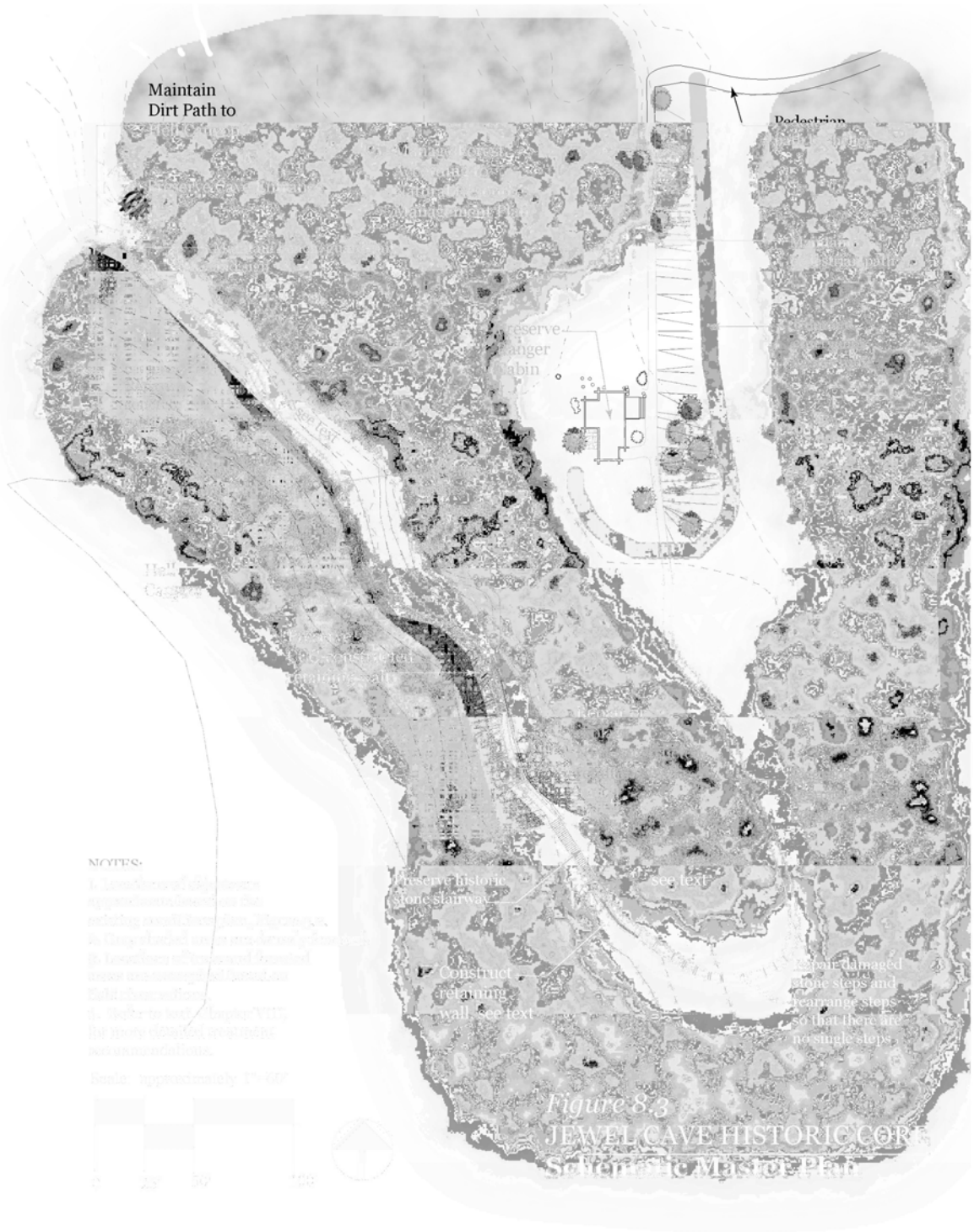


Figure 8.3
JEWEL CAVE HISTORIC CORE
Schematic Master Plan

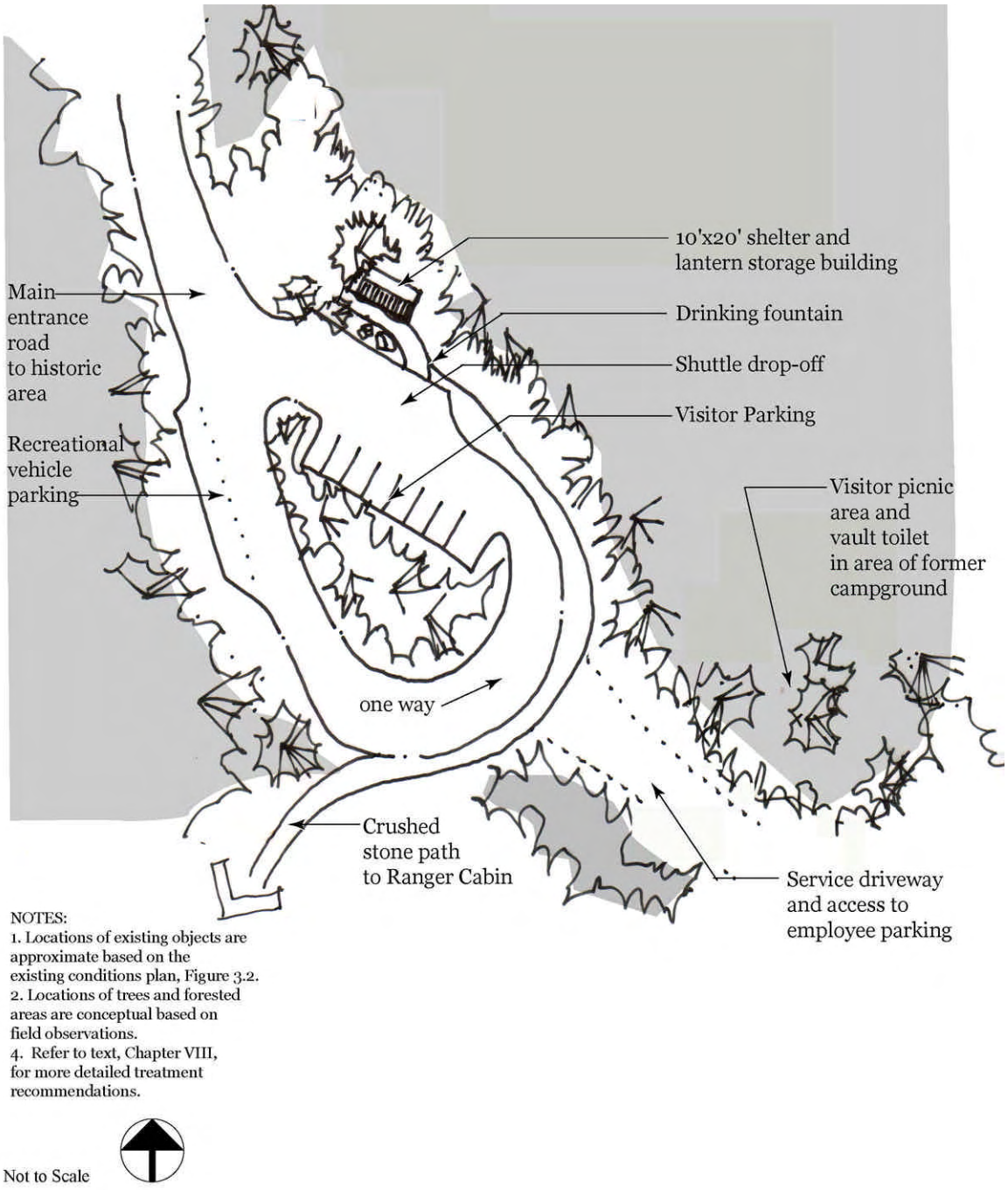


Figure 8.4: Recommended Treatment, Visitor Services Area

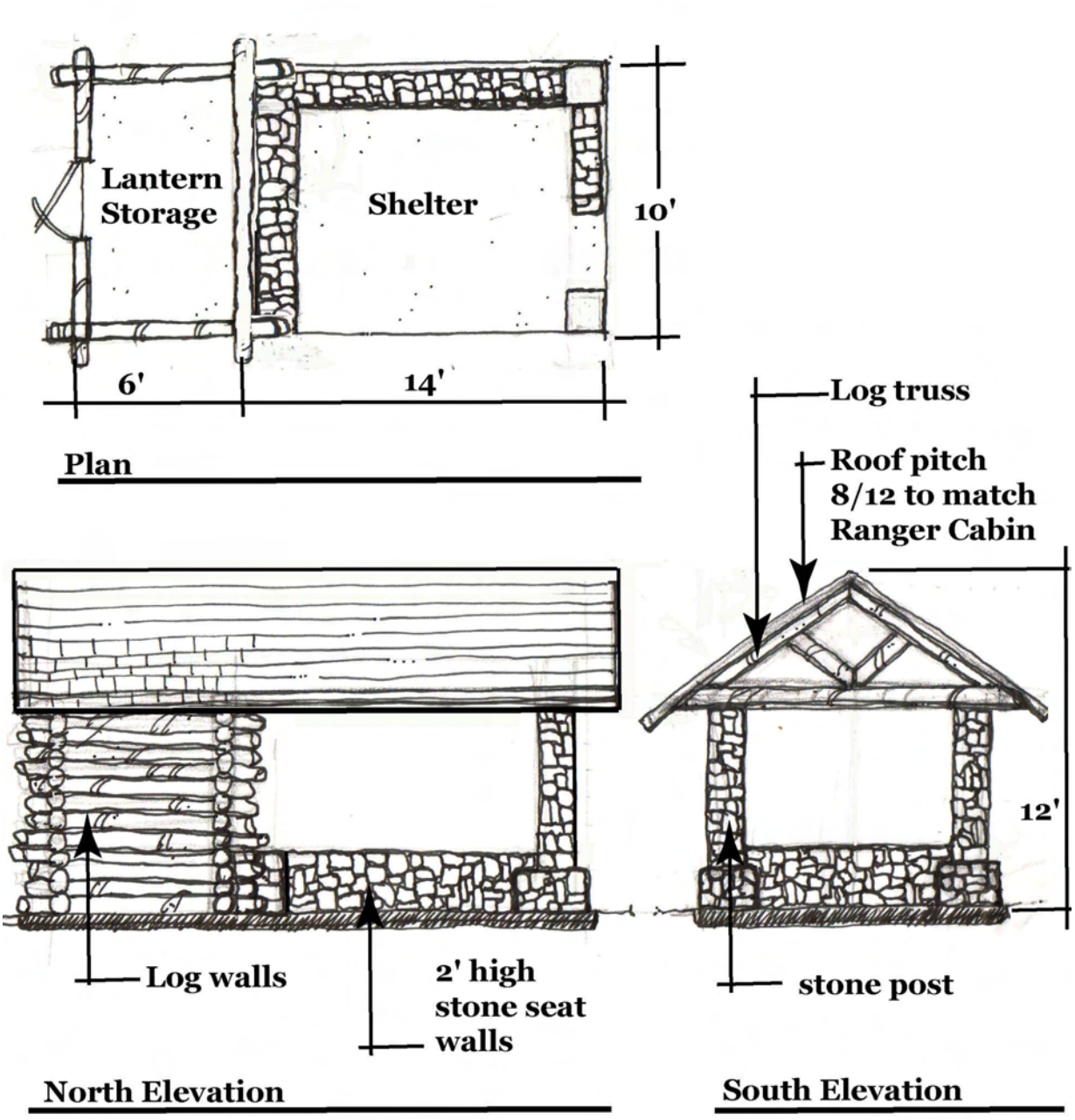


Figure 8.5: Proposed Shelter/Storage Building

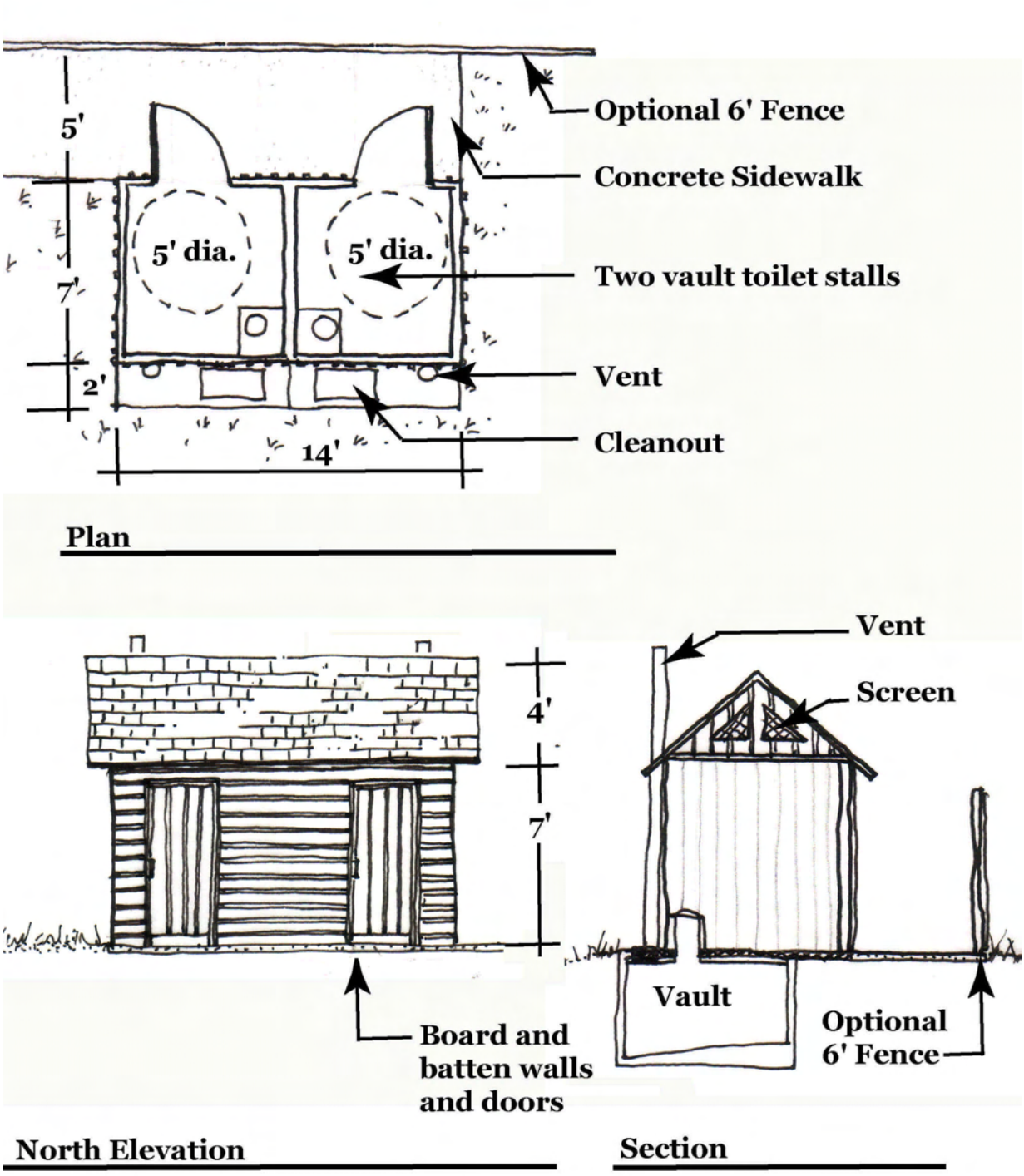


Figure 8.6: Proposed Vault Toilet Building

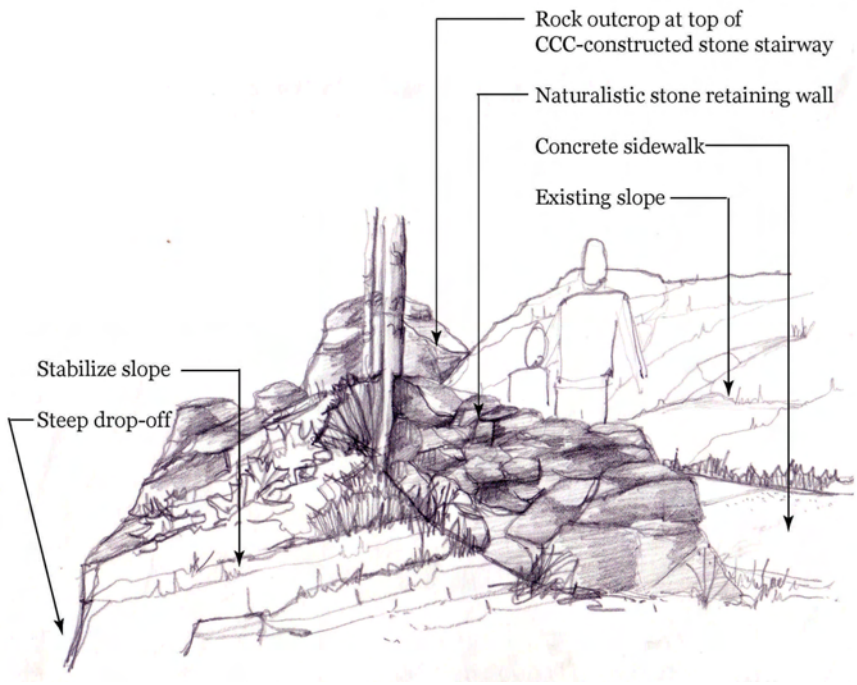


Figure 8.7: Stone Retaining Wall

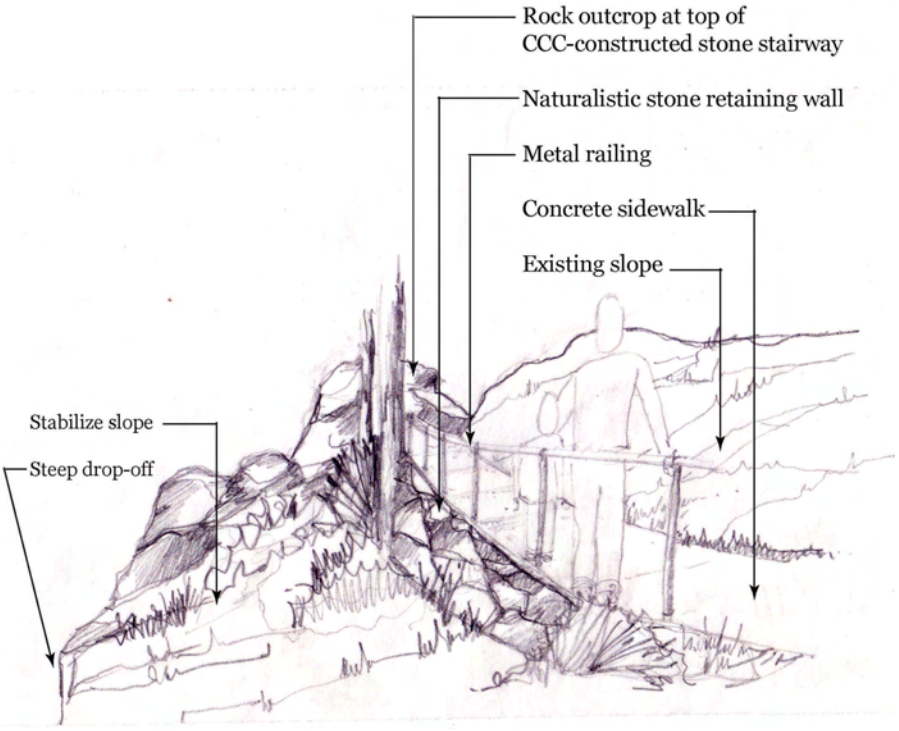


Figure 8.8: Stone Retaining Wall and Metal Railing

Figure 8.9: Existing conditions, Sidewalk and Railing above CCC-Constructed stone stairway *(Source: QEA, June 2003)*

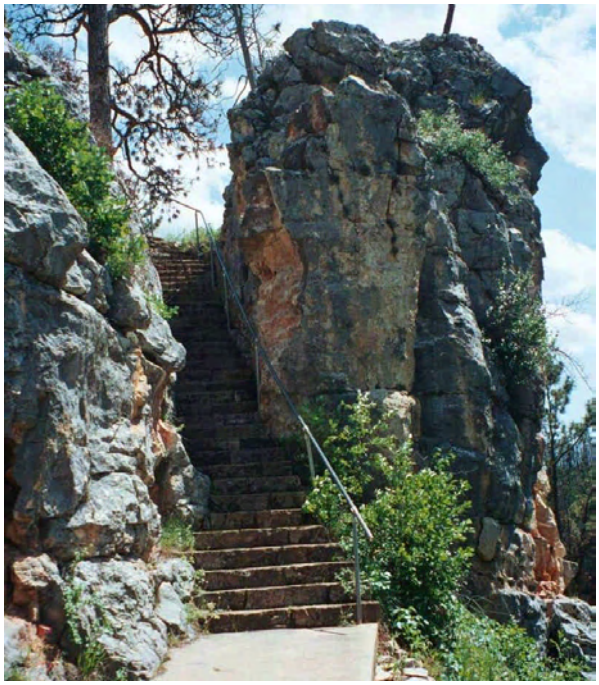


Figure 8.10: Existing Stone CCC-constructed stairway viewed from lower trail (Source: QE|A 2003, Roll 5-2)

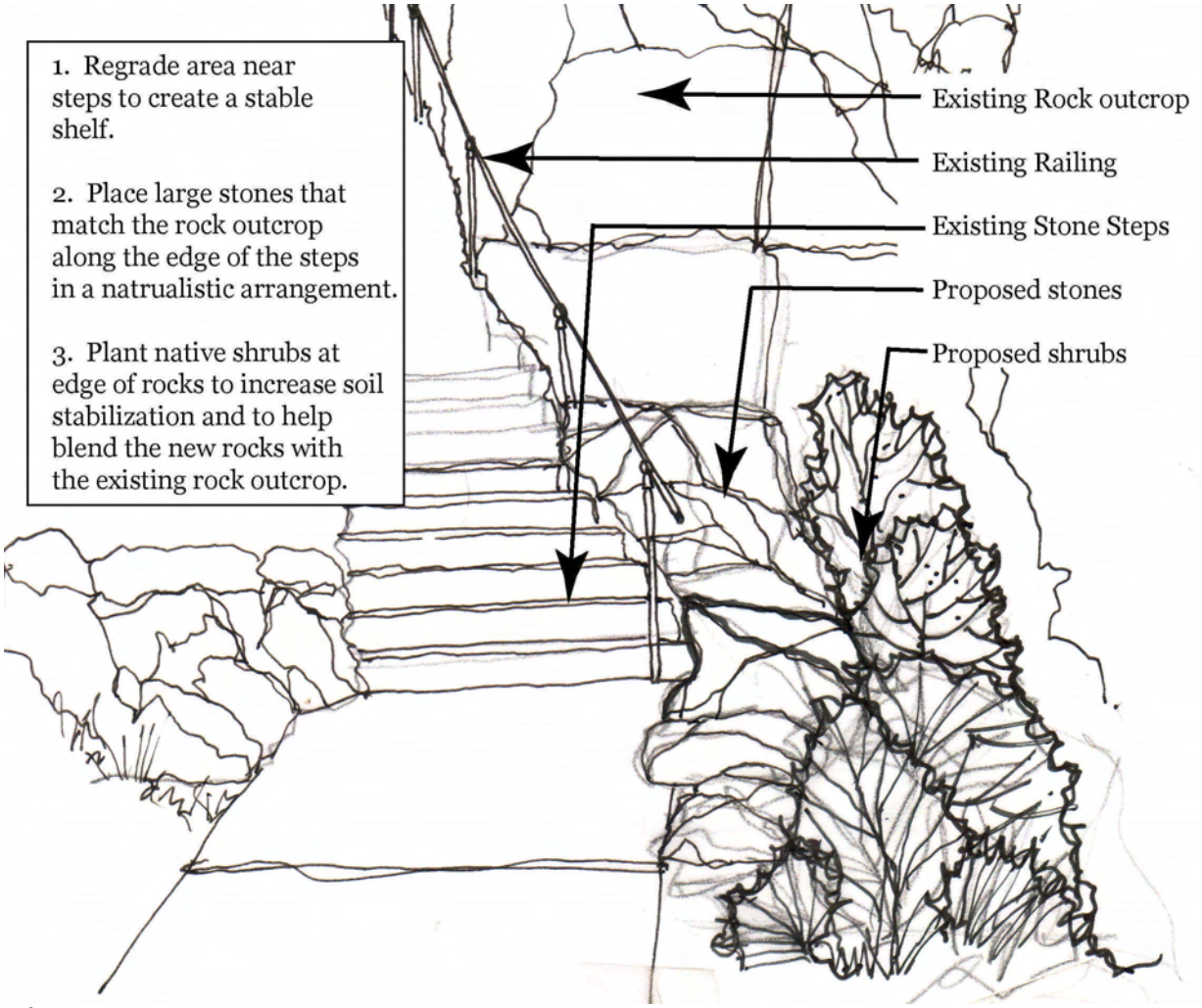


Figure 8.11: Recommended treatment at bottom of CCC-Constructed Steps

Chapter IX:
Costs and Implementation

Implementation Guidelines

This chapter provides guidelines for implementing the Recommended Treatment Approach for the Jewel Cave Historic Area. The implementation has been broken down into three phases. These phases do not imply importance or suggest a sequence for implementation.

Phase I includes projects that can be implemented individually as interim improvements. These projects do not rely on the implementation of other projects to be completed. Included are: *1) Improve the landscape associated with the Ranger Cabin; 2) Repair NPS-Constructed Retaining Wall; 3) Remove Service Drive "A" and associated elements, restore vegetation; and 4) Restore native vegetation in the former housing area south of Service Drive "A."*

Phase II includes projects that relate to the improvement of visitor services at the site. In order to maintain a basic level of visitor comfort and fulfill visitor needs, the projects in this phase should be implemented together. For instance, construct the shelter /storage building and remove the lantern storage shed and visitor seating area at the same time. Projects include: *1) Construct shelter/storage building; 2) construct vault toilet building; 3) remove existing lantern shed; 4) remove visitor seating area and drinking fountain; 5) establish visitor picnic area; 6) construct shuttle drop-off area.*

Phase III projects relate to the restoration of the historic core. These projects may be implemented individually. However, construction related to these projects will impact visitor access to the historic cave entrance. Implementing these projects individually may result in limited access for a number of seasons. Therefore, it is

recommended that the Phase III projects be implemented together. Projects include:

1) restore upper trail to cave entrance; 2) restore lower trail to cave entrance; 3) repair CCC-constructed retaining wall.

Phase I Implementation: Interim Improvements

Project: Improve landscape associated with Ranger Cabin

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Recondition soil at building	*23*	*SY*	*$ 2.00*	*$ 46.00*	
Install junipers	*3*	*EA*	*$75.00*	*$225.00*	
Remove driveway surface (gravel)	*90*	*SY*	*$ 3.00*	*$270.00*	
Disposal	*90*	*SY*	*$ 3.00*	*$270.00*	
Recondition soil at former driveway	*90*	*SY*	*$ 2.00*	*$180.00*	
Seed at former driveway & other	*100*	*SY*	*$ 1.20*	*$120.00*	
Project Cost:					*$ 1,111.00*

Project: Repair NPS-Constructed Retaining Wall

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Structural Evaluation			*$3,000*		
Comprehensive Erosion Control Plan			*$3,000*		
Implement Plan (cost unknown)					
Project Cost:					*unable to estimate*
Or					
Grade area above wall	*200*	*CY*	*$ 80.00*	*$16,000.00*	
Install erosion control mat	*200*	*SY*	*$ 20.00*	*$ 4,000.00*	
Re-establish vegetation	*200*	*SY*	*$ 4.00*	*$ 800.00*	
Repair stone wall	*96*	*CF*	*$100.00*	*$ 9,600.00*	
Install drain behind wall	*70*	*LF*	*$ 15.00*	*$ 1,050.00*	
Pipe to outlet	*15*	*LF*	*$ 15.00*	*$ 225.00*	
Erosion resistant outlet	*1*	*EA*	*$300.00*	*$ 300.00*	
Project Cost:					*$31,975.00*

Project: Remove Service Drive "A" and associated elements, restore vegetation

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Remove Pavement and gravel	*240*	*SY*	*$ 14.00*	*$ 3,360.00*	
Compact soil	*240*	*SY*	*$ 1.00*	*$ 240.00*	
Condition Soil/Topsoil	*120*	*CY*	*$ 10.00*	*$ 1,200.00*	
Erosion control material	*1*	*Allow*	*$ 500.00*	*$ 500.00*	
Seed	*120*	*SY*	*$ 1.20*	*$ 144.00*	
Project Cost:					*$ 5,444.00*

Project: Restore Native Vegetation in former Housing Area South of Service Drive "A"

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Remove gravel	*240*	*SY*	*$ 14.00*	*$ 3,360.00*	
Condition Soil/Topsoil	*120*	*CY*	*$ 10.00*	*$ 1,200.00*	
Erosion control	*1*	*Allow*	*$ 500.00*	*$ 500.00*	
Seed	*120*	*SY*	*$ 5.00*	*$ 600.00*	
Project Cost:					*$ 5,660.00*

SUBTOTAL PHASE I IMPLEMENTATION: $44,190.00

Phase II Implementation: Improve Visitor Services

Project: Construct Shelter / Storage Building

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Construct Building	*1*	*Allow*	*$ 30,000.00*	*$ 30,000.00*	
Concrete Sidewalk 4"	*20*	*SY*	*$ 56.00*	*$ 1,120.00*	
Eyewash station	*1*	*EA*	*$ 200.00*	*$ 200.00*	
Drinking fountain	*1*	*EA*	*$ 800.00*	*$ 800.00*	
Grading	*10*	*CY*	*$ 80.00*	*$ 800.00*	
Seed	*30*	*SY*	*$ 1.20*	*$ 36.00*	
Project Cost:					*$ 32,956.00*

Project: Construct Vault Toilet Building

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Construct Building	*1*	*Allow*	*$ 4,000.00*	*$ 4,000.00*	
Concrete Sidewalk 4"	*10*	*SY*	*$ 56.00*	*$ 560.00*	
Grading	*10*	*CY*	*$ 80.00*	*$ 800.00*	
Seed	*30*	*SY*	*$ 1.20*	*$ 36.00*	
Project Cost:					*$ 5,396.00*

Project: Remove existing Lantern Shed

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Remove Building	*385*	*CF*	*$ .60*	*$ 231.00*	
Remove Eyewash station	*1*	*EA*	*$ 100.00*	*$ 100.00*	
Project Cost:					*$ 331.00*

Remove visitor seating area and drinking fountain

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Remove Gravel	*50*	*SY*	*$ 5.00*	*$ 250.00*	
Remove Benches	*1*	*Allow*	*$ 100.00*	*$ 100.00*	
Remove Drinking Fountain	*1*	*Allow*	*$ 150.00*	*$ 150.00*	
Condition Soil/Topsoil	*25*	*CY*	*$ 10.00*	*$ 250.00*	
Seed	*50*	*SY*	*$ 1.20*	*$ 60.00*	
Project Cost:					*$ 810.00*

Establish Visitor Picnic Area

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Picnic Area Sign	*1*	*Allow*	*$ 200.00*	*$ 200.00*	
Picnic Tables	*4*	*EA*	*$ 600.00*	*$2,400.00*	
Trash Receptacles	*2*	*EA*	*$ 600.00*	*$1,200.00*	
Project Cost:					*$3,800.00*

Construct Shuttle Drop-off Area

Prepare site	*24*	*SY*	*$ 5.00*	*$ 120.00*	
Concrete Pavement 6"	*24*	*SY*	*$ 14.00*	*$ 336.00*	
Project Cost:					*$ 456.00*

SUBTOTAL PHASE II IMPLEMENTATION: $43,749.00

Phase III Implementation: Restore Historic Core

Project: Restore Upper Trail to Cave Entrance

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Survey	*1*	*Allow*	*$2,000.00*	*$ 2,000.00*	
Construction Documents	*1*	*Allow*	*$2,000.00*	*$ 2,000.00*	
Remove Pavement	*180*	*SY*	*$ 18.00*	*$ 3,240.00*	
Exposed Aggregate Concrete SW	*180*	*SY*	*$ 80.00*	*$14,400.00*	
Erosion control	*1*	*Allow*	*$ 500.00*	*$ 500.00*	
Topsoil	*30*	*CY*	*$ 10.00*	*$ 300.00*	
Seed	*90*	*SY*	*$ 1.20*	*$ 108.00*	
Project Cost (excluding new retaining wall):					*$ 22,548.00*
Stone retaining wall opt.1	*1*	*Allow*	*$10,000.00*	*$10,000.00*	
or					
Stone retaining wall opt.2	*1*	*Allow*	*$ 8,000.00*	*$ 8,000.00*	
Project Cost:	*(assuming option #1)*				*$10,000.00*

Project: Restore Lower Trail to Cave Entrance

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Survey	*1*	*Allow*	*$3,000.00*	*$ 2,000.00*	
Construction Documents	*1*	*Allow*	*$3,000.00*	*$ 3,000.00*	
Remove Pavement	*151*	*SY*	*$ 20.00*	*$ 3,020.00*	
Exposed Aggregate Concrete SW	*151*	*SY*	*$ 80.00*	*$12,080.00*	
Erosion control	*1*	*Allow*	*$ 1,000.00*	*$ 500.00*	
Project Cost:					*$20,600.00*

Project: Repair CCC-Constructed Retaining Wall

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Survey	*1*	*Allow*	*$ 5,000.00*	*$ 5,000.00*	
Construction Documents	*1*	*Allow*	*$ 5,000.00*	*$ 5,000.00*	
Erosion control	*1*	*Allow*	*$20,000.00*	*$20,000.00*	
Project Cost:					*$30,000.00*

Project: Construct Rock Barrier at Bottom of Stone Steps

ITEM	*QTY.*	*UNIT*	*UNIT COST*	*ITEM TOTAL*	*SUBTOTAL*
Rock Barrier at bottom of stone steps	*1*	*Allow*	*$15,000.00*	*$15,000.00*	
Project Cost:					*$15,000.00*

SUBTOTAL PHASE III IMPLEMENTATION: $98, 148.00

TOTAL IMPLEMENTATION ALL PHASES COMBINED: $186,087.00

Chapter X:
Consultation and Coordination

CHAPTER X: CONSULTATION AND COORDINATION

The National Park Service mailed a press release (presented on the following page) to the Custer Chronicle and Rapid City Journal on June 9, 2003 to announce the date for the two public scoping meetings. National Park Service representatives were present at the Custer Library at the designated time (June 17, 2003 at 1 pm and 6 pm) for the public meetings. However, the local newspapers did not publish the public scoping meeting notice resulting in no attendance at the designated meeting times. Subsequent to the intended meetings, the NPS mailed letters explaining the project and asking for public input. Letters were sent to 100 landowners in the Pass Creek area. Coordination/scoping letters were also sent to the following offices during the week of December 8, 2003:

- U.S. Forest Service
- Custer County Commissioners Office
- Custer Chamber of Commerce
- Mayor of Custer
- Office of Senator Tom Daschle
- Office of Senator Tim Johnston
- The Nature Conservancy

The NPS received two responses to the scoping letters. The responses are included at the end of this chapter.

FOR IMMEDIATE RELEASE *MIKE WILES*
(605) 673-2288

CULTURAL LANDSCAPE REPORT

PUBLIC SCOPING MEETINGS

Jewel Cave National Monument will be conducting research to complete a ***Cultural Landscape Report with Environmental Assessment (CLR)****. The National Park Service (NPS) uses these documents to guide the treatment and use of park historic landscapes. Jewel Cave's approximately 10 acre historic area contains a Civilian Conservation Corps (CCC) era ranger cabin and landscape development consisting of a ¼-mile long stone trail and stairway and cave entrance. The cabin is listed on the National Register of Historic Places (NRHP).*

The ***CLR*** *will include historic research and documentation of the historic area over time, a record of existing conditions, and an evaluation of landscape character and integrity. Schematic treatment recommendations will address how the park can adequately protect and manage historic landscape resources, resolve life safety concerns, rehabilitate or restore missing features, and meet uniform accessibility requirements from the cabin to the cave entrance. It will also include suggestions for phasing and cost estimates for implementation.*

The project may include developing ***HABS/HAER/HALS*** *documentation for the historic area. This documentation includes a description of existing conditions and construction changes made throughout the life of the property. It will establish an overview of the historic area according to its context, in relationship to federal works programs and the rustic architecture and landscape architecture design movement in the National Park Service system.*

Two public scoping meetings will be held in Custer on Tuesday, June 17, 2003. They will be held 1-3 p.m. and 6-8 p.m. in the Pine Room.

For more information, call 605-673-2288 x1221. The staff at Jewel Cave looks forward to visiting with you and receiving your input.

Steve Baldwin
25260 Ridge View Rd.
Custer, SD 57730

March 5, 2004

Todd Suess, Superintendent
Jewel Cave National Monument
Rt.1 Box 60AA
Custer, SD 57730

Dear Todd,

Thank you for sharing the various proposals for treatment of the historic area of the monument.

After reviewing the analysis and proposals, I have come to he conclusion that Treatment Alternative #3 would be the best course of action as long it doesn't entail a high dollar cost of implementation or future maintenance. In that case, I would recommend alternative #1 as the are is in pretty good condition and there aren't really any additional items needing protection or preservation beyond the cabin.

Sincerely,

Steve Baldwin

3-19-04

Todd Suess
Supt Jewel Cave
National Monument
RR 1-Box 60AA
Custer, S.D. 57730

Todd:

Thanks for explaining your project regarding the Historic Rangers Cabin at Jewel Cave.

I believe you have the names of some people that could help in providing information you are looking for.

There are two items that I feel should be addressed;

1. The provision for handicaped access to the area and maybe the cabin. If you are going to allow folks to enter the cabin, handicaped people should be included.
2. A storm or rain shelter should be part of the project plan. Rain storms

in these old Black Hills can come up fast and deliver a lot of rain and maybe hail in a short time. I would think a rain shelter would be part of the plan. I know in treatment Alternative 3. you also mention a weather shelter.

are there going to be items of historic value of the era you are working on in the cabin? My thoughts here are saws, cant-hooks, draw knives or other tools of the era or records of activities during this time period.

If I think of anything else I will give you a call.

Best Regards

Jack McBride

Jack McBride
R.R. 1 Box 60X
Custer, SD 57730

Mr. Todd Suess, Supt.
Jewel Cave National Monument
RR 1 - Box 60AA
Custer, S.D. 57730